GMW

USER'S MANUAL

MODEL: 5970-80
MODEL: 5970-160

CURRENT REVERSAL SWITCH

Date Sold: ____________

Serial number: _________

GMW 955 Industrial Road, San Carlos, CA 94070 Tel: (650) 802-8292 Fax: (650) 802-8298
Email: greg@gmw.com Web site: http://www.gmw.com

TABLE OF CONTENTS

Continued

DRAWINGS (continued)

Drawing 11900561 5970-80 General Assembly, [shown with optional ADI]
Drawing 11900562 5970-80 General Assembly, [shown without optional ADI]
Drawing 11900571 5970-80 Base Plate Assembly, [shown with optional ADI]
Drawing 11900572 5970-80 Base Plate Assembly, [shown without optional ADI]
Drawing 11900580 5970-80 Contactor Assembly
Drawing 11900590 5970-80 Front Panel Assembly
Drawing 11900601 5970-80 Back Panel Assembly, [shown with optional ADI]
Drawing 11900602 5970-80 Back Panel Assembly, [shown without optional ADI]
Drawing 11900611 5970-160 General Assembly, [shown with optional ADI]
Drawing 11900612 5970-160 General Assembly, [shown without optional ADI]
Drawing 11900621 5970-160 Base Plate Assembly, [shown with optional ADI]
Drawing 11900622 5970-160 Base Plate Assembly, [shown without optional ADI]
Drawing 11900630 5970-160 Contactor Assembly
Drawing 11900640 5970-160 Front Panel Assembly
Drawing 11900651 5970-160 Back Panel Assembly, [shown with optional ADI]
Drawing 11900652 5970-160 Back Panel Assembly, [shown without optional ADI]
Drawing 15900000 5970-80/160 Control PCB Assembly
Drawing 15900010 5970-80/160 Front Panel PCB Assembly

Section 1
SPECIFICATIONS
Table 1. Model 5970-80 Specifications

<u>Electrical</u>

DC Voltage (maximum):	100 Volts
DC Current (maximum):	80 Amps
AC Voltage:	100-125 or 200-250 Volts
AC Current:	2.0/1.0 Amps
DC Internal power supply (control power):	24VDC/2.4A

<u>Fuse Ratings</u>

AC Input:	for 115V use 20 x 5 mm 2.0Amp SLO-BLOW
AC Input:	for 230V use 20 x 5 mm 1.0Amp SLO-BLOW
DC Interlock:	use 20 x 5 mm 2Amp SLO-BLOW

<u>Electrical Connections</u>

DC Current: (up to 80A max)	M6 Stud
DC Control wiring:	Phoenix Plug/Header Type: MSTB
AC Power:	IEC320

<u>Analog Device Interface</u> (Option)

GPIB Plug.	GPIB Female

<u>Spare Parts Kit</u>

Pilot lamps 12V (x 2).
Fuses type 20 x5 mm 1.0 Amp SLO-BLOW (x 5)
Fuses type 20 x5 mm 2.0 Amp SLO-BLOW (x 5)

<u>Dimensions</u>

483 mm W x 541mm D x 177 mm H.
(19.0 inch W x 21.3 Inch D x 7.0 inch H).

<u>Weight</u>

20kg (44 lb), excluding interconnecting cables.

Section 1
SPECIFICATIONS
Table 1. Model 5970-160 Specifications

Electrical

DC Voltage (maximum):	100 Volts
DC Current (maximum):	160 Amps
AC Voltage:	100-125 or 200-250 Volts
AC Current:	2.0/1.0 Amps
DC Internal power supply (control power):	24VDC/2.4A

Fuse Ratings

AC Input:	for 115V use 20 x 5 mm 2.0Amp SLO-BLOW
AC Input:	for 230V use 20 x 5 mm 1.0Amp SLO-BLOW
DC Interlock:	use 20 x 5 mm 2Amp SLO-BLOW

Electrical Connections

DC Current: (up to 160A max)	M12 Stud
DC Control wiring:	Phoenix Plug/Header Type: MSTB
AC Power:	IEC320

Analog Device Interface (Option)

GPIB Plug.	GPIB Female

Spare Parts Kit

Pilot lamps 12V (x 2).
Fuses type 20 x5 mm 1.0 Amp SLO-BLOW (x 5)
Fuses type 20 x5 mm 2.0 Amp SLO-BLOW (x 5)

Dimensions

483 mm W x 495 mm D x 266 mm H.
(19.0 inch W x 19.5 inch D x 10.5 inch H)

Weight

22 kg (48 lb), excluding interconnecting cables.

Section 2

WARNINGS
REFER TO WARNINGS BELOW
BEFORE OPERATING CURRENT REVERSAL SWITCH

1 AC Power

Ensure that the **VOLTAGE SELECTOR** has been set to the correct input voltage before applying AC Input Power. To check the Voltage Selector first turn off power on the AC input receptacle and remove the AC input plug. The voltage displayed next to the triangle on the lower right hand side of the AC input receptacle is the voltage setting. To change the voltage settings insert a small bladed screwdriver into the slot on the top of the Fuse Drawer located directly below the ground pin on the AC input receptacle and pull the Fuse Drawer out. Check the the correct fuse is inserted in the correct location. A 2.0A fuse is used for 115 Vac and 1.0A fuse used for 230Vac The Fuse Drawer should then be rotated 180° and reinserted. Check that the correct voltage setting is displayed next to the triangle on the lower right hand side of the AC input receptacle.

2 DC Interlock

Check the operation of the DC Interlock circuit before operating the Reversal Switch. Turn on the DC Power Supply and increase the output voltage to 2 volts. The High Current Interlock light on the front panel should illuminate and relay RL2 should be energized. If the lamp does not illuminate check the High Current Interlock circuit and remedy the problem before using the Reversal Switch.

3 Arcing

The magnet stores considerable energy in its field during operation. Do not disconnect any high current or ac power lead while under load or the magnetic field energy may be discharged across the interruption causing severe and hazardous arcing.

4 Current Rating

Do not exceed the current rating for the Current Reversal Switch given in the specification tables in section 1 of this User’s Manual. Exceeding the current rating is dangerous and will damage the internal components. Damage caused by using the Current Reversal Switch at higher currents than specified will void the warranty.

5 Watches, Credit Cards, Magnetic Discs and Pacemakers

Do not move magnetically sensitive items into the close vicinity of the magnet. Even some anti-magnetic watches can be damaged when placed in close proximity to the pole gaps during operation. Credit cards, magnetic discs and pacemakers may be affected by magnetic fields as low as 5G (0.5mT).

Table 2. Model 5970-80/160 Electrical Connections

DC Current to Magnet (refer to drawing 13900360/1)
TB1 Left hand terminal: Positive
TB1 Right hand terminal: Negative

DC Current from Power Supply (refer to drawing 13900360/1)
TB2 Left hand terminal: Positive
TB2 Right hand terminal: Negative

Ground (refer to drawing 13900360/1)
Ground connections are provided at two locations on the main terminal block on Model 5970-80.
A grounding stud is provided near the main terninal block on Model: 5970-160.

Magnet Interlocks (refer to drawing 13900360/1)

Pin 1 & Pin 2	Water flow: Normally open. Closed when flow OK. (not used in standard GMW systems)
Pin 3 & Pin 4	Over temperature: Normally closed. Open when coil temperature exceeds 50^{o}C.

CAUTION : Ensure that the high current connections are tight. Loose connections may lead to oxidation and overheating. The field stability may be degraded and the current terminations damaged.

Section 3

INSTALLATION

Unpacking Instructions

The Model 5970-80/160 is supplied assembled. If damage is evident, report the damage in detail to the shipper for claim and simultaneously notify GMW in case assessment of the damage must be made. Included in the carton should be:

1 x 5970-80/160 Current reversing Switch
1 x Manual
1 x Spare Parts Kit
* 1 x ADI-123 (Optional)
* 1 x ADI-Mounting Kit (Optional)

* If the ADI Option has been ordered it will be installed in the Model 5970-80/160.

Mounting Position

The Model 5970-80/160 Reversal Switch is intended to be operated in the horizontal position either as a bench top unit or in a 19" EIA Equipment Rack.

Electrical Circuit

Never connect or remove cables from the Reversal Switch with the power supply powered. The stored energy in the magnet can cause arcing resulting in severe injury to personnel or equipment damage. All terminals should be tight. If terminals come loose in operation local heating at the terminations can cause rapid oxidation leading to a high contact resistance and high power dissipation at the terminals. If left unattended this can cause enough local heating to damage the terminals.

AC Power (refer to section 2.1)

Section 4

OPERATION

General

Check that the AC voltage setting has been set correctly (refer to previous section) then insert the AC input connector and turn on the AC Power switch. The green pilot light on the front panel should illuminate indicating that the 24V control power supply is on. The white '**HIGH CURRENT INTERLOCK**' should come on if the DC Power Supply voltage is above 2 volts. The reversal switch is interlocked and cannot change the DC polarity until the power supply voltage drops below 1.5V. The yellow pilot lights on the front panel indicate the position of the internal reversal contactor.

To reverse polarity

Push the green push button on the front panel labeled '**PUSH TO REVERSE**'. The following events should take place:

1. Relay RL1 will latch closed programming the DC power supply down to zero current output.
2. Relay RL2 will de-energize when the DC power supply voltage drops below 1.5V, turning off the front panel High Current Interlock light.
3. Then relay RL2 de-energizes it starts both timers TM1 & TM2.
4. Timer TM2 times out after 5.0 seconds providing a delay before actuating the current reversal contactor.
5. M1 then times out after 6.0 seconds resetting RL1 and turning the DC power supply back on. The reversal switch is then ready for another cycle.

Note: The settings of TM1 and TM2 should not need adjustment. If they are readjusted TM1 must be at least 0.5 seconds longer than TM2 delay. A maximum time of 8 seconds should not be exceeded.

Section 5

ANALOG DEVICE INTERFACE
(OPTION)

GENERAL
The Analog Device Interface provides computer control of the Current Reversal Switch using GPIB communications. It is optional equipment and can be field installed if required using the ADI Installation Kit detailed below. Full details on the Group 3 Model ADI-123 Analog Device Interface are given in the separate manual. The ADI has 1 Analog output channel, 2 Analog status channels, and 3 Two-state channels. The channel assignments are given below.

Analog Channels
Analog output: Power supply current output programming.
Analog input 1: Power supply current monitor.
Analog input 2: Power supply voltage monitor.

Two State Channels
Ch1: Magnet temperature and water flow interlock status.
Ch2: Reversal switch control.
Ch3: Reversal switch position status.

ADI Installation Kit
The following components make up the ADI Installation Kit.

1 x ADI-123G Analog Device Interface.
2 x ADI Mounting Bars. [Dwg no 17900670]
2 x ADI Mounting Studs. [Dwg no 179006780]
4 x ADI Mounting Nuts. [M6 Kepnuts]
1 x ADI Control Wiring Harness. [Connects ADI to R/S Control PCD]
1 x ADI Control Wiring Harness. [Connects ADI to R/S Control PCD]
1 x ADI Mains Wiring Harness. [Connects ADI to R/S Control PCD]
1 x ADI Connecting GPIB Cable 0.5M long [Connects ADI to R/S bulkhead GPIB Connector].
1 x R/S GPIB Bulkhead GPIB Connector.
4 x R/S GPIB Bulkhead Connector Mountings Screws.
4 x R/S GPIB Bulkhead Connector Mountings Washers
4 x R/S GPIB Bulkhead Connector Mountings Nuts.

GPIB Installation Kit
The following components are required to control the Current Reversal Switch through the ADI using a computer. All the following items can be purchased through GMW Associates if required.

Controlling Computer.
Controlling Software.
GPIB Interface Board IEEE-488 [National Instruments Part no or similar].
GPIB Connecting Cable IEEE-488 [National Instruments Part no or similar].

Section 5

ANALOG DEVICE INTERFACE
(OPTION)

Field Installation of the Analog Device Interface.

1. Turn off the magnet power supply and turn off the ac power and remove the power cord to the current reversal switch.
2. Remove the four screws securing the reversal switch cover and remove top cover.
3. Remove the four screws and cover plate from the cutout for the GPIB connector on the back panel.
4. Screw on a kepnut onto the ADI mounting studs about 6mm, so that the lock washer faces the short end of the mounting stud. Repeat for the other mounting stud.
5. Screw the mounting studs 6mm into the current reversal switch base plate threaded holes using the short threaded end.
6. Tighten down the kepnut on the mounting stud against the current reversal switch base plate, repeat for the other mounting stud.
7. Remove the ADI’s bottom cover by undoing the center securing screw and mount the ADI mounting bars to the bottom cover using M3 pan head screws. [Only required if the ADI mounting bars are not fitted to the ADI].
8. Set the ADI DIP switches as required. GMW normally uses address 1 for the ADI installed in the current reversal switch. [Only required if ADI has not been set up at GMW or end user needs to change the ADI to another GPIB address.]
9. Reinstall the bottom cover onto the ADI and secure with the single center screw.
10. Plug in the control wiring harness into the ADI with the 9way connector.
11. Plug in the control wiring harness into the ADI with the 10way connector.
12. Mount the ADI into the current reversal switch by sliding the mounting bars over the two vertical mounting studs located on the current reversal switch base plate.
13. Secure the ADI in place with two kepnuts.
14. Pull off one of the QC connectors located on the back of the ac input power receptacle. Push on a QC receptacle from the ADI power lead with the same color wire onto the ac power filter.
15. Push on the removed QC receptacle from the internal power supply onto the tab of the ADI QC receptacle.
16. Repeat for the other three QC connections.
17. Check that the wire colors are the same on each terminal of the ac filter and the removed QC receptacles are returned to their original location.
18. Plug in the control wiring from the ADI with the 9-way plug into the vertical receptacle on the control PCD.
19. Plug in the control wiring from the ADI with the 10-way plug into the vertical receptacle on the control PCD. The connector should be installed with the male GPIB connection and mounting flange facing the inside of the reversal switch case.
20. Secure the bulkhead GPIB connector onto the rear panel of the current reversal switch using the pan head screw provided.
21. Connect the short length GPIB cable between the back of the bulkhead connector on the rear panel and the GPIB connector on the ADI.

Section 5

ANALOG DEVICE INTERFACE
(OPTION)

ADI Commands (Full details given in the ADI User's Manual)

Analog Output Channel

W16383: Set analog output to full scale.
W00000: Set analog output to zero.

Analog Input Channels

R1: Read channel 1, zero input = 0
full scale = 16383.
R2: Read channel 2, zero input = 0
full scale = 16383.

Two State Channels

TR1: Read status 1 (magnet temp and water flow interlock). State 1 = OK.
TR2: Not used.
TR3: Read status 3 (reversal switch position). State 1 = REVERSE.

TW21: Turns on channel 2 (reversal switch start).
TW20: Turns off channel 2.

Note:
1. After TW2 is turned on it must be turned off again to allow the reversal switch circuit to reset before another reversal cycle can take place. Time between TW21 and TW20 should be about 1 sec
2. The ADI two state channel 1 is set with jumpers to the passive position and monitors the magnet interlocks at terminal 4 on P1.

Software Drivers

LabVIEW Driver
A LabVIEW driver is available from GMW Associates. It provides control and monitoring of the model: 5970-80/160 current reversal switch and power supply. The driver is supplied free of charge.

Section 6

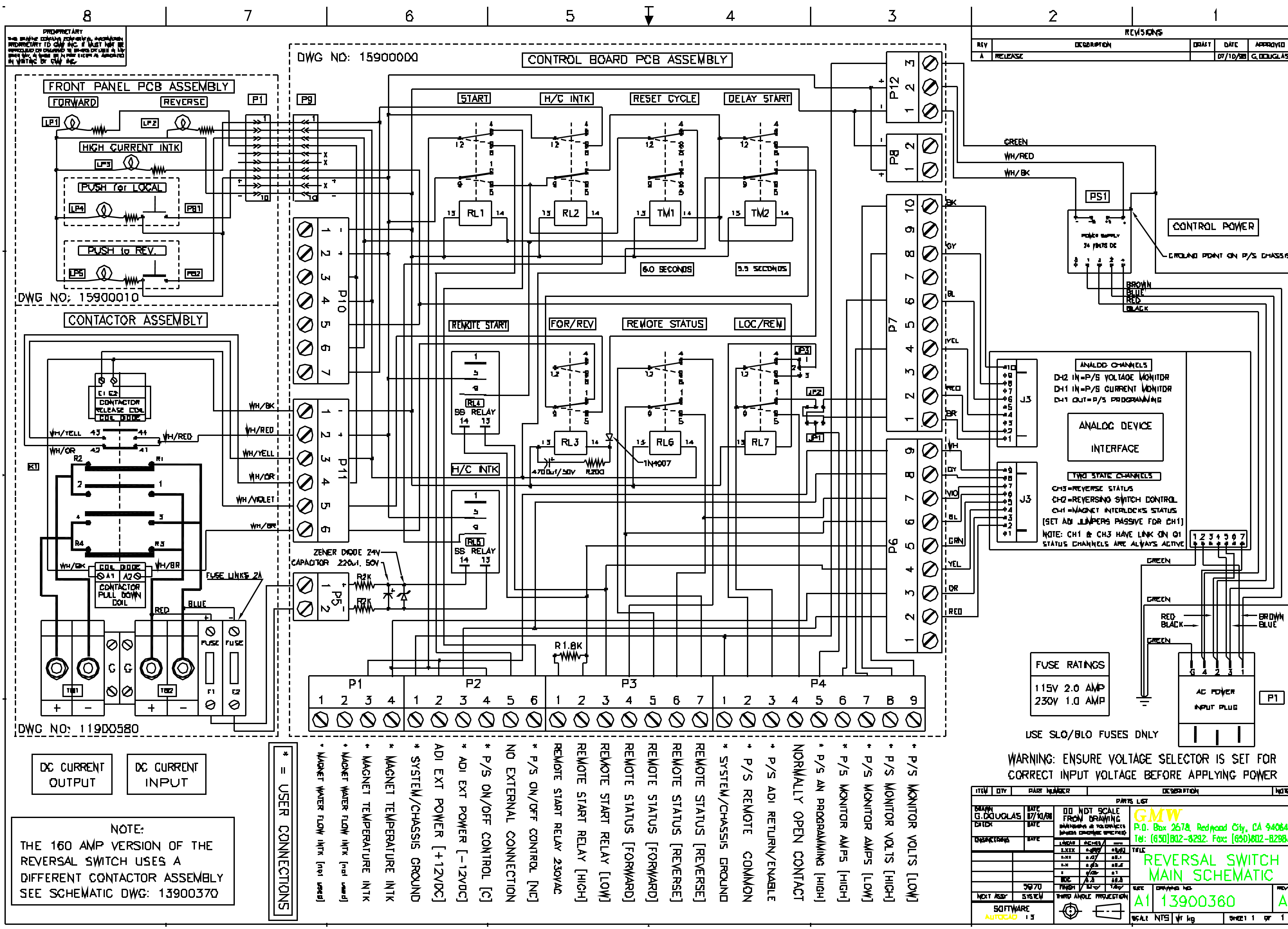
MAINTENANCE

The only routine maintenance required is to ensure that the high current connections are tight and the High Current Interlock is working correctly.

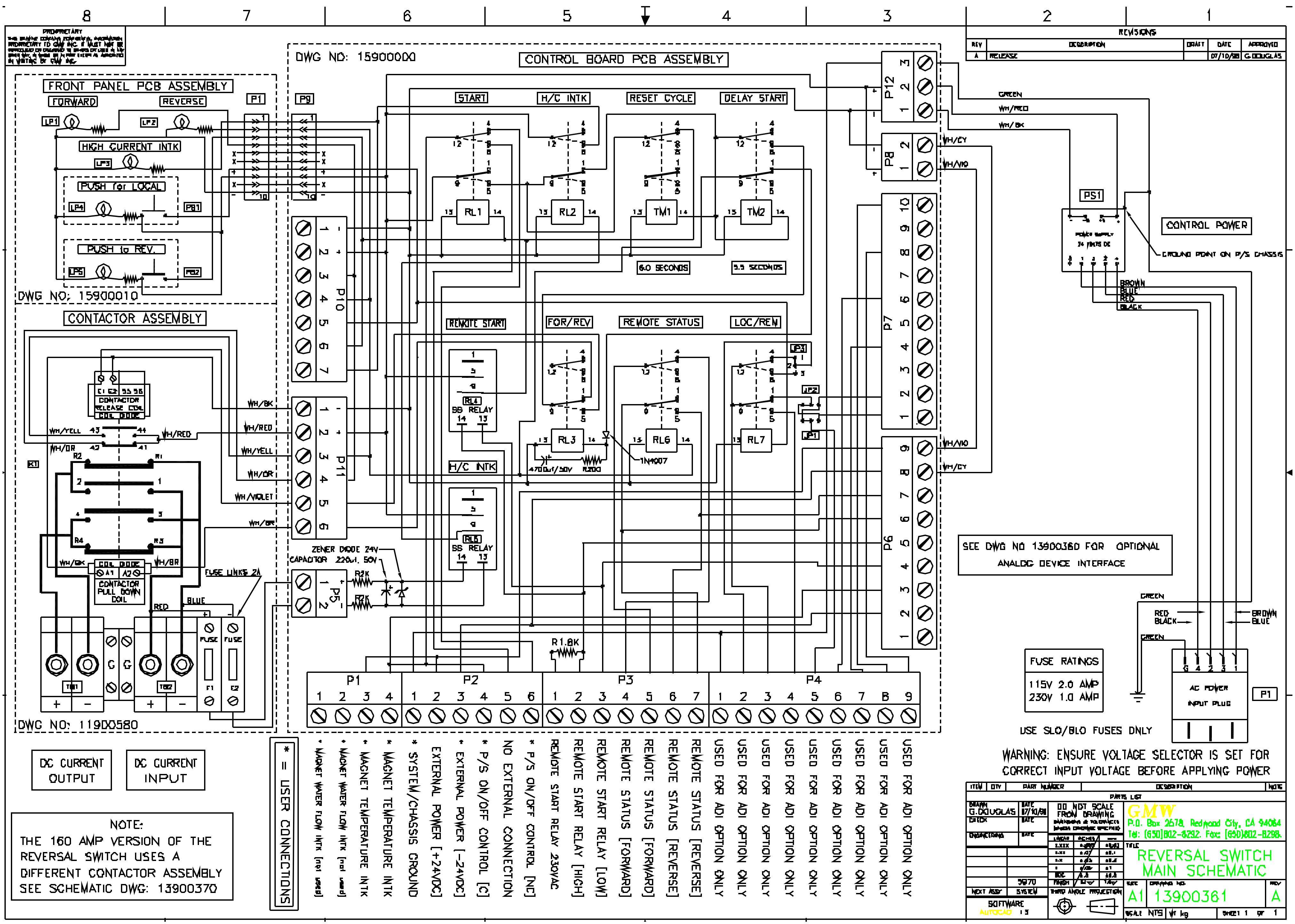
To check the operation of the DC High Current Interlock circuit turn on the DC Power Supply and increase the output voltage to 2 volts. The High Current Interlock light on the front panel should illuminate and relay RL2 should be energized. **If the lamp does not illuminate check the High Current Interlock circuit and remedy the problem before using the Reversal Switch.**

Section 7

DRAWINGS



CONTROL BOARD PCB ASSEMBLY
DWG NO: 15900000
FRONT PANEL PCB ASSEMBLY
FORWARD
REVERSE
HIGH CURRENT INTK
PUSH for LOCAL
PUSH to REV.
DWG NO: 15900010
CONTACTOR ASSEMBLY
CONTACTOR RELEASE COIL
COIL DIODE
CONTACTOR PULL DOWN COIL
FUSE LINKS 2A
DWG NO: 11900580
DC CURRENT OUTPUT
DC CURRENT INPUT
NOTE:
THE 160 AMP VERSION OF THE REVERSAL SWITCH USES A DIFFERENT CONTACTOR ASSEMBLY SEE SCHEMATIC DWG: 13900370
* = USER CONNECTIONS
START
H/C INTK
RESET CYCLE
DELAY START
6.0 SECONDS
5.5 SECONDS
REMOTE START
FOR/REV
REMOTE STATUS
LOC/REM
SS RELAY
ZENER DIODE 24V
CAPACITOR 220uf, 50V
CONTROL POWER
GROUND POINT ON P/S CHASSIS
POWER SUPPLY 24 VOLTS DC
ANALOG CHANNELS
CH2 IN=P/S VOLTAGE MONITOR
CH1 IN=P/S CURRENT MONITOR
CH1 OUT=P/S PROGRAMMING
ANALOG DEVICE INTERFACE
TWO STATE CHANNELS
CH3=REVERSE STATUS
CH2=REVERSING SWITCH CONTROL
CH1=MAGNET INTERLOCKS STATUS
[SET ADI JUMPERS PASSIVE FOR CH1]
NOTE: CH1 & CH3 HAVE LINK ON 01
STATUS CHANNELS ARE ALWAYS ACTIVE
AC POWER INPUT PLUG
FUSE RATINGS
115V 2.0 AMP
230V 1.0 AMP
USE SLO/BLO FUSES ONLY
WARNING: ENSURE VOLTAGE SELECTOR IS SET FOR CORRECT INPUT VOLTAGE BEFORE APPLYING POWER
* MAGNET WATER FLOW INTK [not used]
* MAGNET WATER FLOW INTK [not used]
* MAGNET TEMPERATURE INTK
* MAGNET TEMPERATURE INTK
* SYSTEM/CHASSIS GROUND
ADI EXT POWER [+12VDC]
* ADI EXT POWER [-12VDC]
* P/S ON/OFF CONTROL [C]
NO EXTERNAL CONNECTION
* P/S ON/OFF CONTROL [NC]
REMOTE START RELAY 230VAC
REMOTE START RELAY [HIGH]
REMOTE START RELAY [LOW]
REMOTE STATUS [FORWARD]
REMOTE STATUS [FORWARD]
REMOTE STATUS [REVERSE]
REMOTE STATUS [REVERSE]
* SYSTEM/CHASSIS GROUND
* P/S REMOTE COMMON
* P/S ADI RETURN/ENABLE
NORMALLY OPEN CONTACT
* P/S AN PROGRAMMING [HIGH]
* P/S MONITOR AMPS [HIGH]
* P/S MONITOR AMPS [LOW]
* P/S MONITOR VOLTS [HIGH]
* P/S MONITOR VOLTS [LOW]
REVISIONS
REV DESCRIPTION DRAFT DATE APPROVED
A RELEASE 07/10/98 G.DOUGLAS
GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (650)802-8292 Fax: (650)802-8298
REVERSAL SWITCH MAIN SCHEMATIC
A1 13900360
REV A
DRAWN G.DOUGLAS 07/10/98
DO NOT SCALE FROM DRAWING
THIRD ANGLE PROJECTION
SCALE NTS
SHEET 1 OF 1
NEXT ASSY 5670 SYSTEM
SOFTWARE AUTOCAD 13



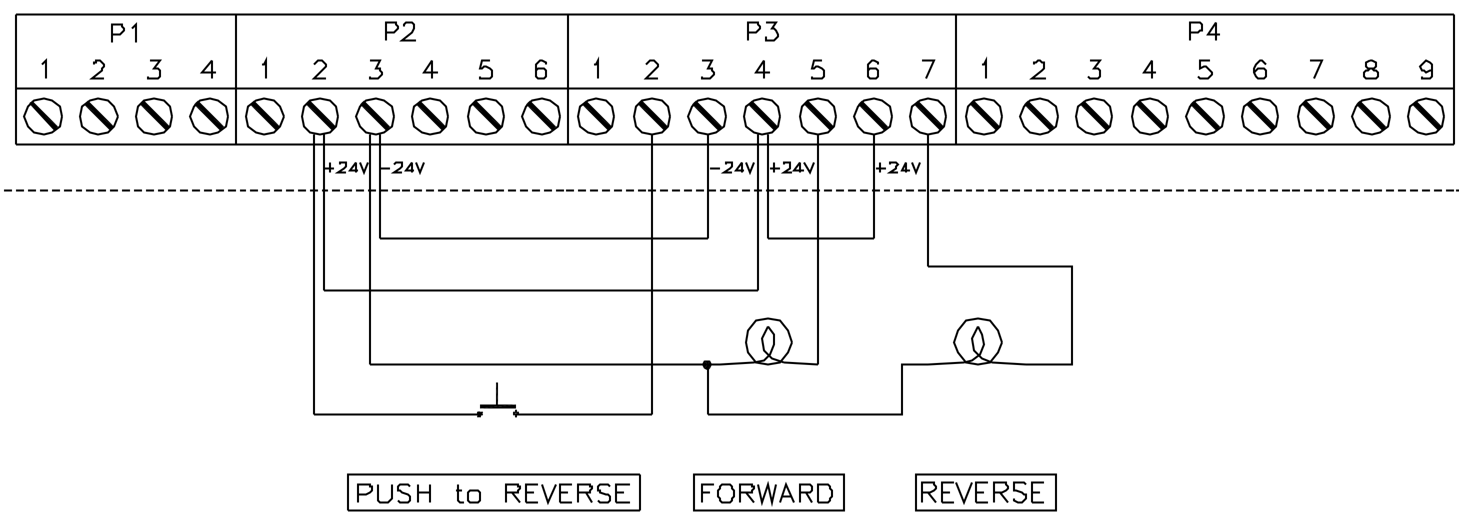
PROPRIETARY
CONTROL BOARD PCB ASSEMBLY
DWG NO: 15900010
FRONT PANEL PCB ASSEMBLY
FORWARD
REVERSE
HIGH CURRENT INTK
PUSH for LOCAL
PUSH to REV.
DWG NO: 15900010
CONTACTOR ASSEMBLY
CONTACTOR RELEASE COIL
CONTACTOR PULL DOWN COIL
FUSE LINKS 2A
DWG NO: 119D0580
DC CURRENT OUTPUT
DC CURRENT INPUT
NOTE:
THE 160 AMP VERSION OF THE REVERSAL SWITCH USES A DIFFERENT CONTACTOR ASSEMBLY SEE SCHEMATIC DWG: 13900370
START
H/C INTK
RESET CYCLE
DELAY START
6.0 SECONDS
5.5 SECONDS
REMOTE START
FOR/REV
REMOTE STATUS
LOC/REM
SS RELAY
1N4007
470uf/50V
ZENER DIODE 24V
CAPACITOR 220uf, 50V
R1.8K
P1 P2 P3 P4 P5 P6 P7 P8 P9 P10 P11 P12
PS1
CONTROL POWER
GROUND POINT ON P/S CHASSIS
SEE DWG NO 13900360 FOR OPTIONAL ANALOG DEVICE INTERFACE
FUSE RATINGS
115V 2.0 AMP
230V 1.0 AMP
USE SLO/BLO FUSES ONLY
AC POWER INPUT PLUG
WARNING: ENSURE VOLTAGE SELECTOR IS SET FOR CORRECT INPUT VOLTAGE BEFORE APPLYING POWER
* = USER CONNECTIONS
* MAGNET WATER FLOW INTK [not used]
* MAGNET WATER FLOW INTK [not used]
* MAGNET TEMPERATURE INTK
* MAGNET TEMPERATURE INTK
* SYSTEM/CHASSIS GROUND
EXTERNAL POWER [+24VDC]
* EXTERNAL POWER [-24VDC]
* P/S ON/OFF CONTROL [C]
NO EXTERNAL CONNECTION
* P/S ON/OFF CONTROL [NC]
REMOTE START RELAY 230VAC
REMOTE START RELAY [HIGH]
REMOTE START RELAY [LOW]
REMOTE STATUS [FORWARD]
REMOTE STATUS [FORWARD]
REMOTE STATUS [REVERSE]
REMOTE STATUS [REVERSE]
USED FOR ADI OPTION ONLY
REVISIONS
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GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (650)802-8292. Fax: (650)802-8298.
REVERSAL SWITCH MAIN SCHEMATIC
A1 13900361 A
SCALE NTS SHEET 1 OF 1
5970
SOFTWARE AUTOCAD 13

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		08/08/97	G.DOUGLAS

REVERSAL SWITCH CONTROL PCB ASSEMBLY

PART NO: 15900000 REVISION: A



REMOTE CONTROLS USING INTERNAL 24V POWER SUPPLY

SEE DRAWING NO 13900312 FOR REMOTE CONTROLS USING EXTERNAL POWER SUPPLY

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

PARTS LIST

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CHECK DATE
ENGINEERING DATE
NEXT ASSY 5970 SYSTEM
SOFTWARE: AUTOCAD 13

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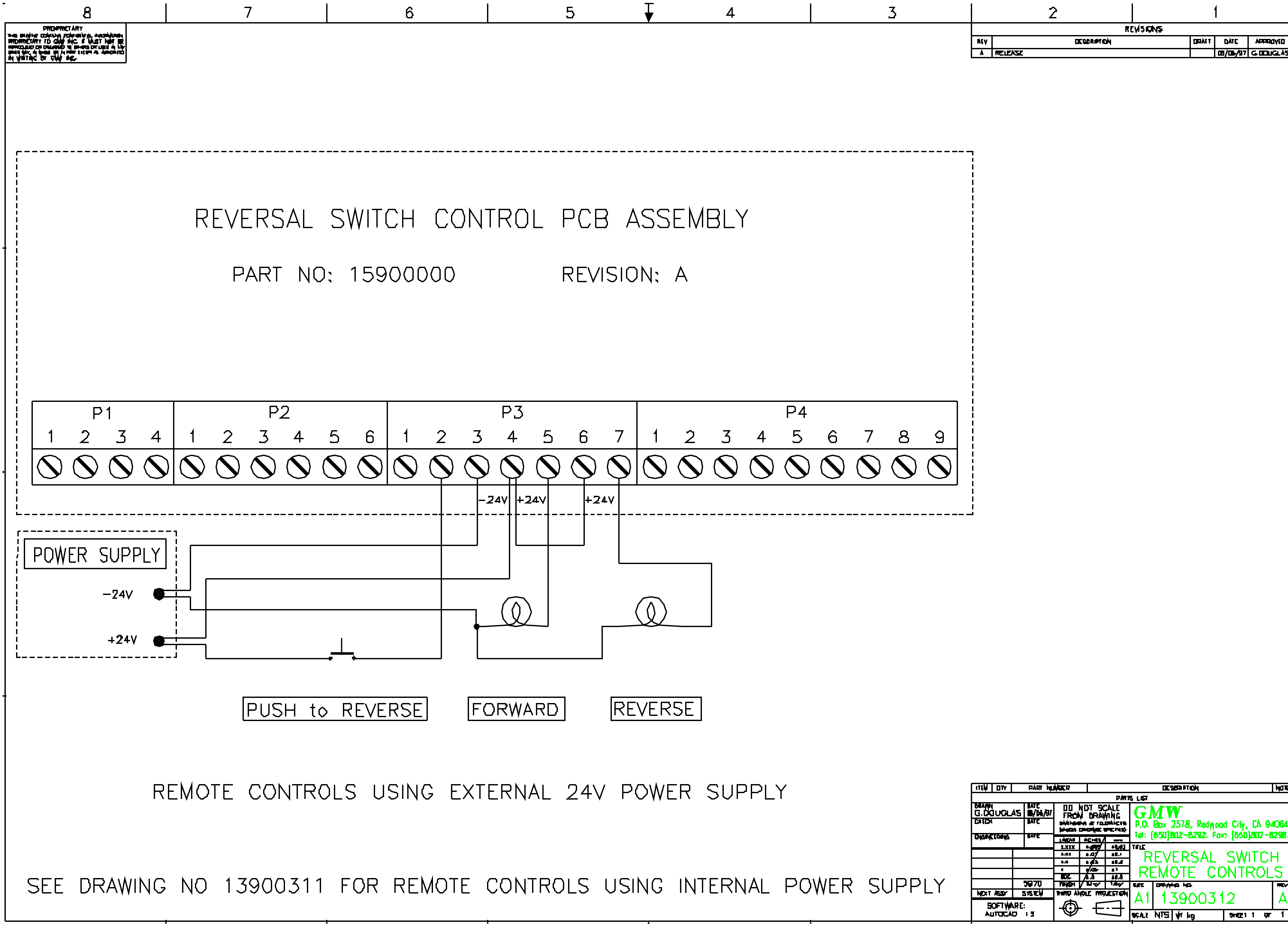
THIRD ANGLE PROJECTION

GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (650)802-8292 Fax: (650)802-8298

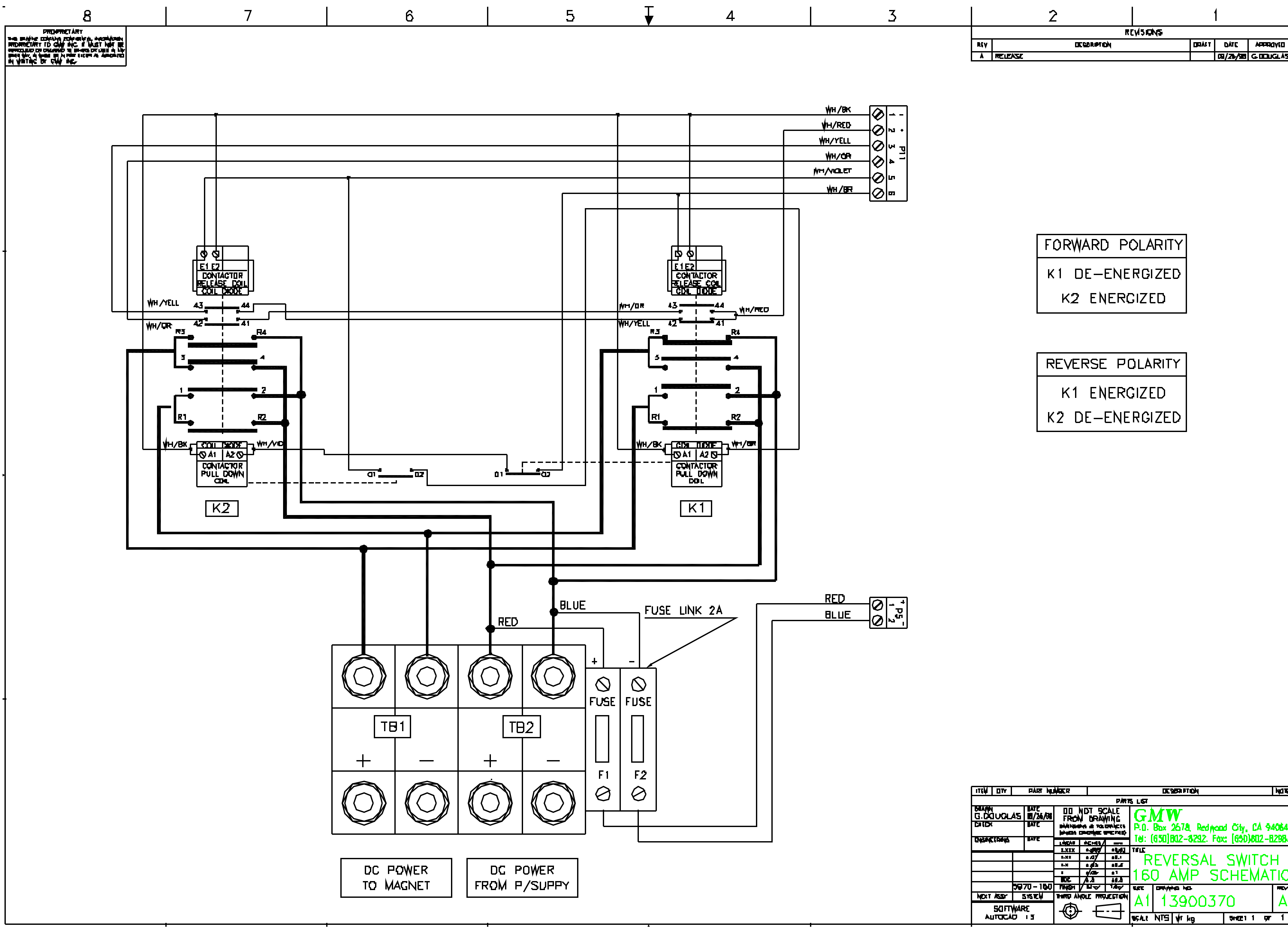
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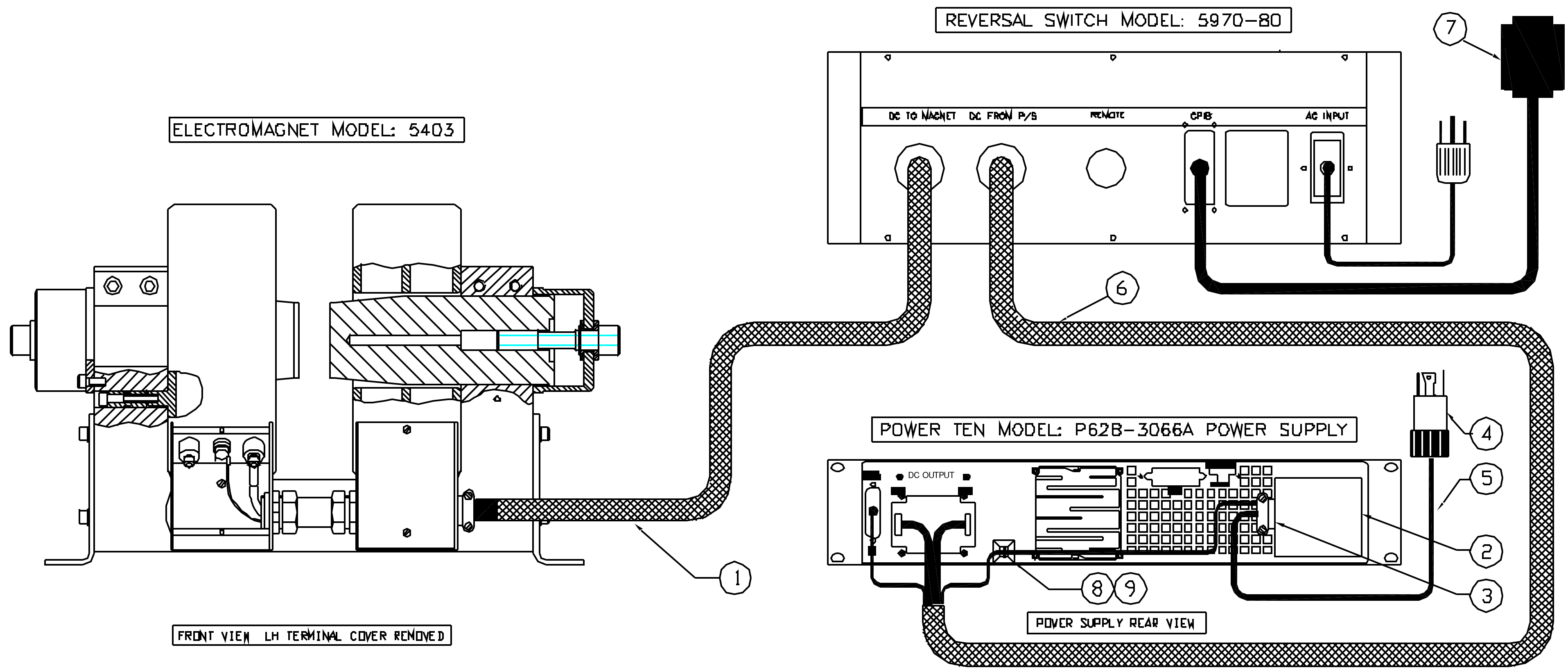
SCALE NTS WT kg SHEET 1 OF 1



REVERSAL SWITCH CONTROL PCB ASSEMBLY
PART NO: 15900000
REVISION: A
P1
P2
P3
P4
-24V
+24V
+24V
POWER SUPPLY
-24V
+24V
PUSH to REVERSE
FORWARD
REVERSE
REMOTE CONTROLS USING EXTERNAL 24V POWER SUPPLY
SEE DRAWING NO 13900311 FOR REMOTE CONTROLS USING INTERNAL POWER SUPPLY
PROPRIETARY
REVISIONS
REV
DESCRIPTION
DRAFT
DATE
APPROVED
A
RELEASE
08/08/97
G.DOUGLAS
DO NOT SCALE FROM DRAWING
GMW
P.O. Box 2578, Redwood City, CA 94064
REVERSAL SWITCH
REMOTE CONTROLS
A1
13900312
A
DRAWN
G.DOUGLAS
5970
NEXT ASSY
SOFTWARE:
NTS



PROPRIETARY
REVISIONS
REV | DESCRIPTION | DRAFT | DATE | APPROVED
A | RELEASE | | 08/26/98 | G.DOUGLAS
P11
WH/BK
WH/RED
WH/YELL
WH/OR
WH/VIOLET
WH/BR
E1 E2
CONTACTOR RELEASE COIL COIL DIODE
CONTACTOR PULL DOWN COIL
K1
K2
FORWARD POLARITY
K1 DE-ENERGIZED
K2 ENERGIZED
REVERSE POLARITY
K1 ENERGIZED
K2 DE-ENERGIZED
RED
BLUE
P5
FUSE LINK 2A
FUSE
F1
F2
TB1
TB2
DC POWER TO MAGNET
DC POWER FROM P/SUPPY
DO NOT SCALE FROM DRAWING
GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (650)802-8292 Fax: (650)802-8298
REVERSAL SWITCH
160 AMP SCHEMATIC
A1 13900370
A
DRAWN G.DOUGLAS
5970-160
SOFTWARE AUTOCAD 13
THIRD ANGLE PROJECTION
SCALE NTS
SHEET 1 OF 1



*** WARNING ***

CHECK AC POWER VOLTAGE AND FREQUENCY MATCH POWER SUPPLY SPECIFIED REQUIREMENTS BEFORE APPLYING AC INPUT POWER

NOTE

1. POWER SUPPLY SHOWN WITH 2 PHASE 208V AC INPUT
2. REFER TO TABLE ON DWG 13900290 FOR AC INPUT RATINGS OTHER THAN 2 PHASE 208V.
3. ABOVE SYSTEM SHOWN WITH OPTIONAL ADI AND GPIB CABLES

N/S=NOT SUPPLIED

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		06/17/97	G.DOUGLAS

PARTS LIST

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
9	1	08461	CABLE TIE ADHESIVE MTG, NYL BAR-LOK	
8	1	08429	CABLE TIE,NYLON 2.5mm WIDE. BAR-LOK	
7	1	L900 001-1-3	GPIB INTERFACE CABLE [2M LONG]	3
6	1	16900210	REV/SW TO P62 INTERFACE CABLE	
5	1	4A-1203	POWER CORD, TYPE SO 3 CORE 12AWG	N/S
4	1	L15-20P	PLUG 3PHASE/20A, NYLON. BRYANT	N/S
3	1	3303	CABLE CLAMP, THOMAS & BETTS	
2	1	12900010	AC TERMINAL BOX	
1	1	16900200	CURRENT & INTERLOCK CABLE 60A	

DRAWN G.DOUGLAS DATE 06/17/97
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ENGINEERING DATE
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SOFTWARE AUTOCAD 13
THIRD ANGLE PROJECTION

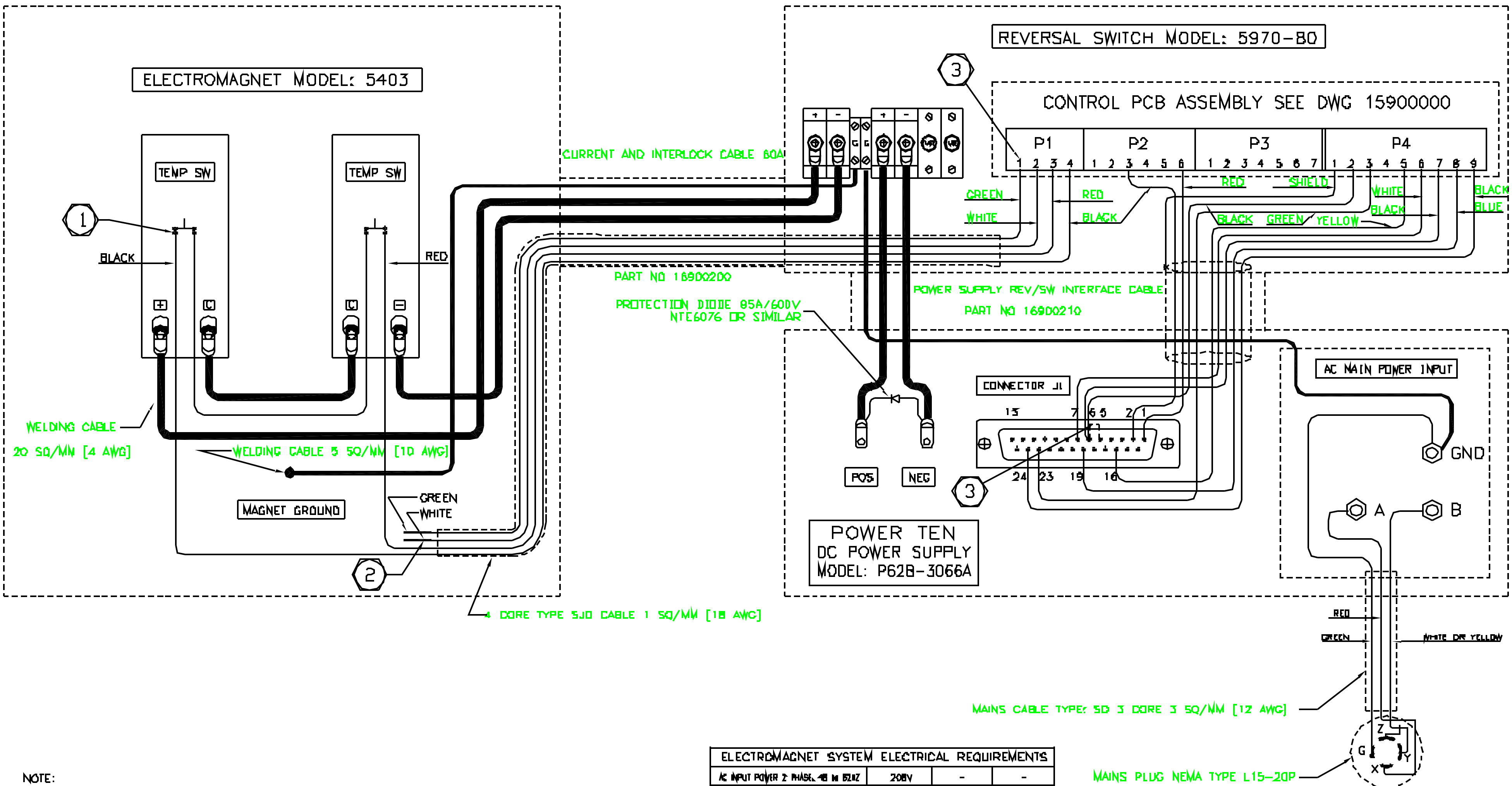
GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (650)802-8292. Fax: (650)802-8298.

TITLE ELECTRICAL ASSY 5403/RS/P62

SIZE A1 DRAWING NO. 11900790 REV A

SCALE NTS WT kg SHEET 1 OF 1

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		05/16/97	G.DOUGLAS
B	CORRECT WIRING ERROR ON CONNECTOR J1		02/11/98	G.DOUGLAS
C	ADD PROTECTION DIODE		12/07/98	G.DOUGLAS



NOTE:

1. CONNECT MAGNET TEMPERATURE INTERLOCK WIRING DIRECTLY ONTO QC TABS ON TEMP SWITCHES.
2. LEAVE WHITE AND GREEN WIRES FULL LENGTH AND INSULATE WITH HEAT SHRINK SLEEVING. CAN BE USED FOR WATER FLOW SWITCH INTERLOCK [OPTIONAL]
3. REMOVE LINK ON CONNECTOR J1 ON POWER SUPPLY, CONNECT WIRES AS SHOWN. [LINK MUST BE FITTED TO ENABLE POWER SUPPLY DC OUTPUT WITHOUT INTERLOCKS CONNECTED]

ELECTROMAGNET SYSTEM ELECTRICAL REQUIREMENTS			
AC INPUT POWER 2 PHASE, 48 to 62HZ	208V	-	-
AC INPUT FULL LOAD CURRENT	10	-	-
RECOMMENDED MAIN AC BREAKER	20	-	-
RECOMMENDED AC POWER OUTLET	L15-20R	-	-
RECOMMENDED AC CABLE SIZE	3 SQ/MM	-	-
NOTE: DRAWING SHOWS POWER SUPPLY FOR US 208V AC POWER			

REVERSAL SWITCH
INPUT POWER: 1PHASE 110V or 230V, 47HZ to 63HZ
FULL LOAD CURRENT: 110V/1.0AMPS or 230V/0.5AMPS

DO NOT SCALE FROM DRAWING

DRAWN G.DOUGLAS 11/18/97

NEXT ASSY 5403 SYSTEM

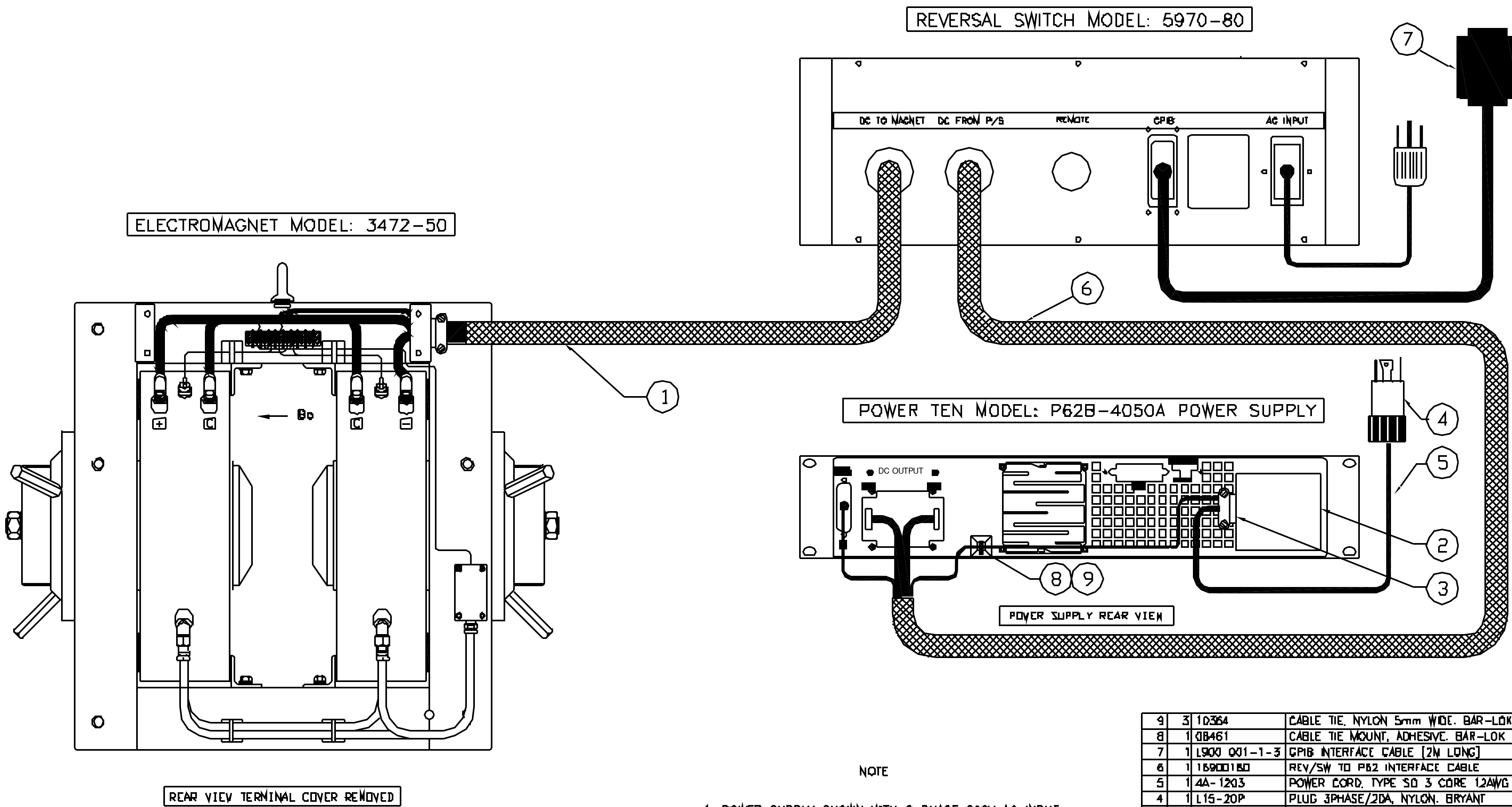
SOFTWARE AUTOCAD 13

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TITLE: ELECTRICAL ASSY 5403/RS/P62

SIZE A1 DRAWING NO. 13900290 REV C

SCALE NTS SHEET 1 OF 1



NOTE

1. POWER SUPPLY SHOWN WITH 2 PHASE 208V AC INPUT
2. REFER TO TABLE ON DWG 13900280 FOR AC INPUT RATINGS OTHER THAN 2 PHASE 208V.
3. ABOVE SYSTEM SHOWN WITH OPTIONAL ADI AND GPIB CABLES

N/S=NOT SUPPLIED

*** WARNING ***

CHECK AC POWER VOLTAGE AND FREQUENCY MATCH POWER SUPPLY SPECIFIED REQUIREMENTS BEFORE APPLYING AC INPUT POWER

PARTS LIST

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
9	3	10364	CABLE TIE, NYLON 5mm WIDE, BAR-LOK	
8	1	08461	CABLE TIE MOUNT, ADHESIVE, BAR-LOK	
7	1	L900 001-1-3	GPIB INTERFACE CABLE [2M LONG]	3
6	1	16900180	REV/SW TO P62 INTERFACE CABLE	
5	1	4A-1203	POWER CORD, TYPE SO 3 CORE 12AWG	N/S
4	1	L15-20P	PLUG 3PHASE/20A, NYLON, BRYANT	N/S
3	1	3303	CABLE CLAMP, THOMAS & BETTS	
2	1	12900010	AC TERMINAL BOX	
1	1	16900110	CURRENT & INTERLOCK CABLE 60A	

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		06/17/97	G.DOUGLAS

PROPRIETARY

DRAWN G.DOUGLAS DATE 06/17/97

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TITLE ELECTICAL ASSY 3472-50/RS/P62

SIZE A1 DRAWING NO. 11900780 REV A

NEXT ASSY 3472-50 SYSTEM

SOFTWARE AUTOCAD 13

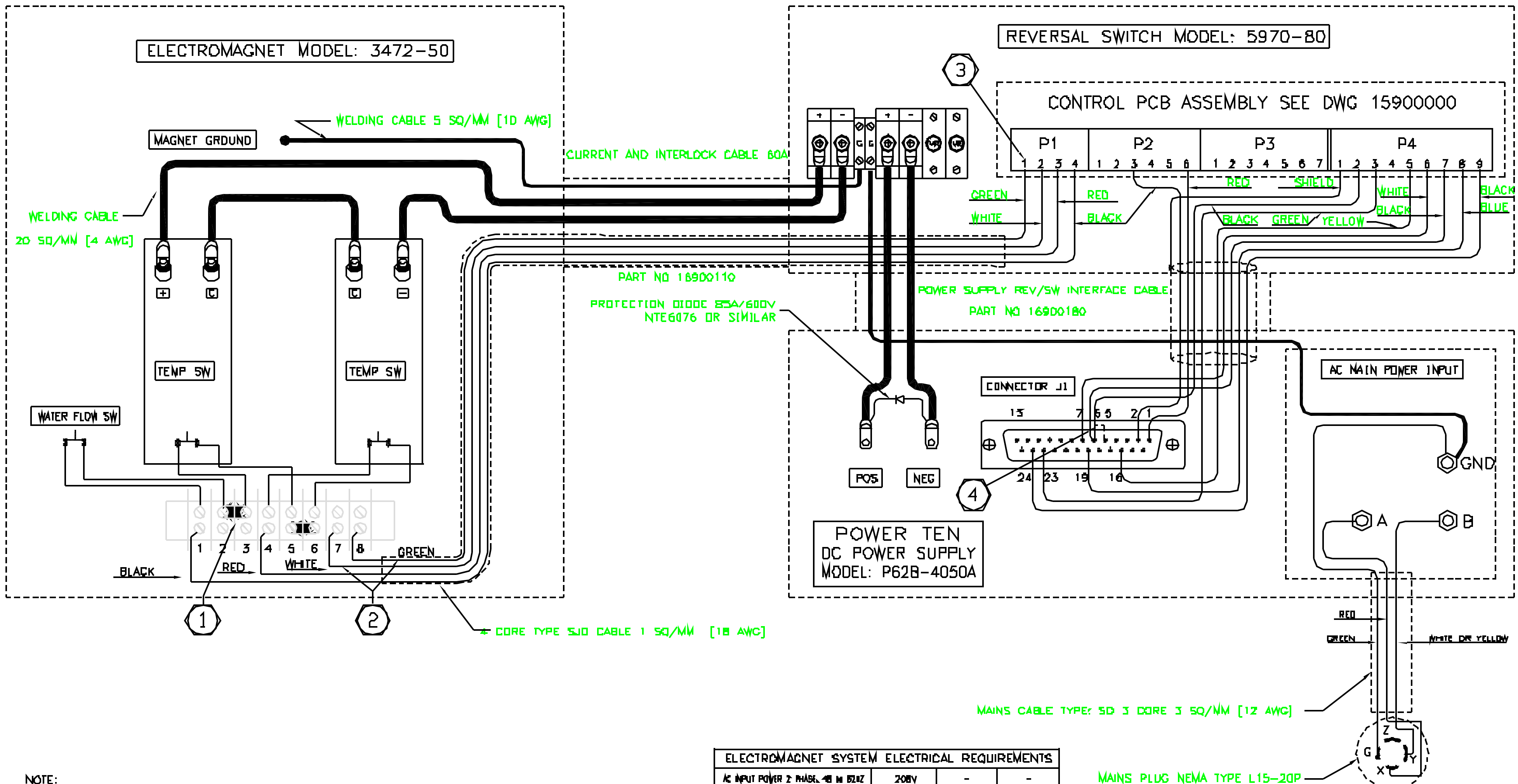
THIRD ANGLE PROJECTION

SCALE NTS WT kg SHEET 1 OF 1

PROPRIETARY
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REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		05/16/97	G.DOUGLAS
B	CORRECT WIRING ERROR ON CONNECTOR J1		02/11/98	G.DOUGLAS
C	ADD PROTECTION DIODE		12/07/98	G.DOUGLAS
D	CORRECT WIRING ERROR @ B7		11/10/99	G.DOUGLAS



ELECTROMAGNET SYSTEM ELECTRICAL REQUIREMENTS			
AC INPUT POWER 2 PHASE, 48 to 62HZ	208V	-	-
AC INPUT FULL LOAD CURRENT	14	-	-
RECOMMENDED MAIN AC BREAKER	20	-	-
RECOMMENDED AC POWER OUTLET	L15-20R	-	-
RECOMMENDED AC CABLE SIZE	3 SQ/MM	-	-
NOTE: DRAWING SHOWS POWER SUPPLY FOR US 208V AC POWER			

REVERSAL SWITCH
INPUT POWER: 1PHASE 110V or 230V, 47HZ to 63HZ
FULL LOAD CURRENT: 110V/1.0AMPS or 230V/0.5AMPS

NOTE:

1. MAGNET WATER FLOW AND TEMP INTERLOCKS LINKED IN SERIES ON MAGNET
2. WHITE AND GREEN WATER FLOW INTERLOCK WIRES TIED TO TERM 7 & TERM 8. [not used]
3. WHITE AND GREEN WATER FLOW INTERLOCK WIRES TIED TO PINS 1 & PIN 2. [not used]
4. REMOVE LINK ON CONNECTOR J1 ON POWER SUPPLY. CONNECT WIRES AS SHOWN. [LINK MUST BE FITTED TO ENABLE POWER SUPPLY DC OUTPUT WITHOUT INTERLOCKS CONNECTED]

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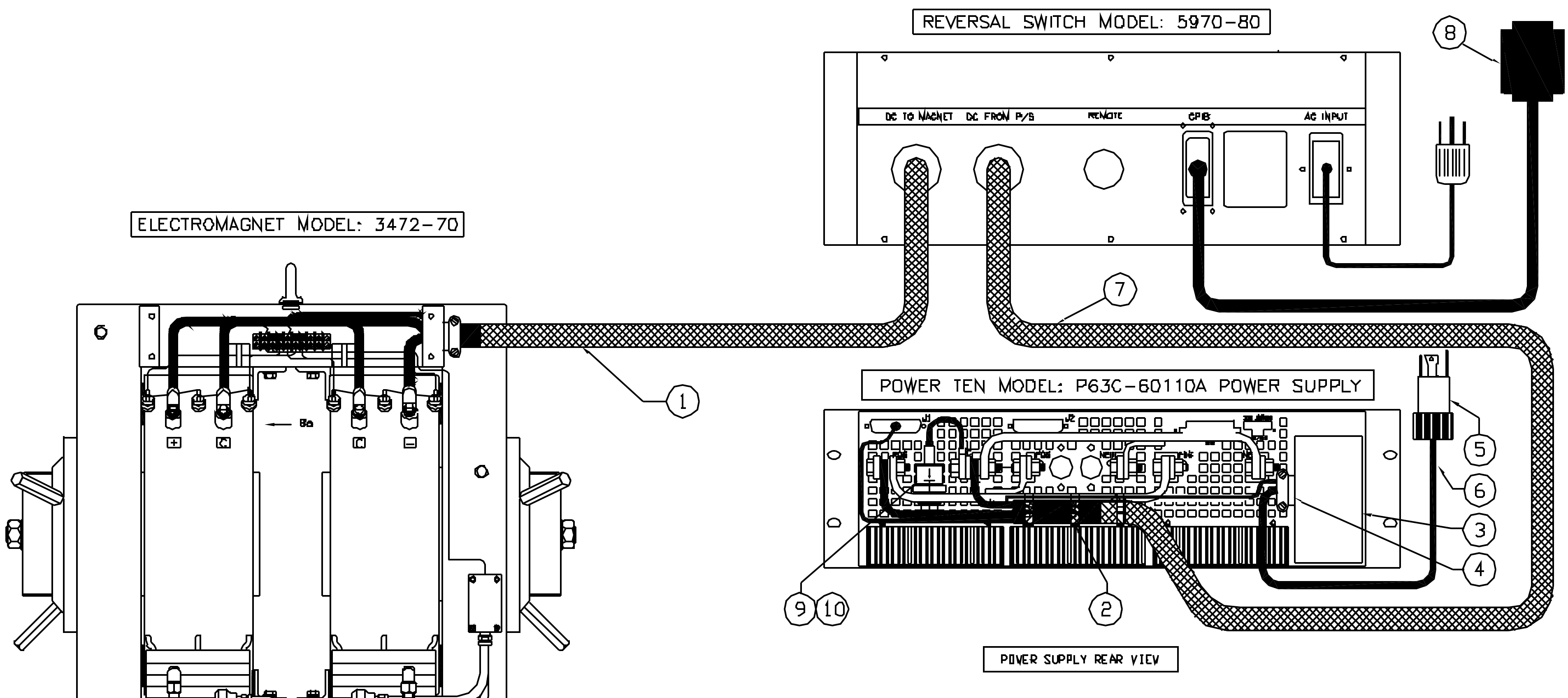
TITLE: ELECTRICAL ASSY 3472-50/RS/P62

SIZE A1 | DRAWING NO. 13900280 | REV D

DRAWN G.DOUGLAS | DATE 05/16/97
DO NOT SCALE FROM DRAWING
NEXT ASSY 3472-50 | SYSTEM
SOFTWARE AUTOCAD 13
THIRD ANGLE PROJECTION
SCALE NTS | WT kg | SHEET 1 OF 1

PROPRIETARY
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REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		06/17/97	G.DOUGLAS
B	ADD PROTECTION DIODE		12/07/98	G.DOUGLAS



REAR VIEW TERMINAL COVER REMOVED

POWER SUPPLY REAR VIEW

NOTE

1. POWER SUPPLY SHOWN WITH 3 PHASE 208V AC INPUT
2. REFER TO TABLE ON DWG 13900270 FOR AC INPUT RATINGS OTHER THAN 3 PHASE 208V.
3. ABOVE SYSTEM SHOWN WITH OPTIONAL ADI AND GPIB CABLES.

N/S=NOT SUPPLIED

*** WARNING ***
CHECK AC POWER VOLTAGE AND FREQUENCY MATCH POWER SUPPLY SPECIFIED REQUIREMENTS BEFORE APPLYING AC INPUT POWER

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
10	1		HEATSHRINK 9mm 3/8" SLEEVING, BLACK	
9	1	NTE6154	RECTIFIER DIODE [Protection Diode] NTE	
8	1	L900 001-1-3	GPIB INTERFACE CABLE [2M LONG]	3
7	1	16900190	REV/SW TO P63C-60110A INTERFACE CABLE	
6	1	4A-1204	POWER CORD, TYPE SO 4 CORE 12AWG	N/S
5	1	L15-20P	PLUG 3PHASE/20A, NYLON, BRYANT	N/S
4	1	3303	CABLE CLAMP, THOMAS & BETTS	
3	1	12900000	AC TERMINAL BOX	
2	3	1D384	CABLE TIE, NYLON 5mm WIDE, BAR-LOK	
1	1	16900120	CURRENT & INTERLOCK CABLE 80A	

PARTS LIST

DRAWN G.DOUGLAS DATE 06/17/97
CHECK DATE
ENGINEERING DATE
DO NOT SCALE FROM DRAWING
NEXT ASSY 3472-70
SOFTWARE AUTOCAD 13
THIRD ANGLE PROJECTION

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TITLE
ELECTRICAL ASSY
3472-70/RS/P63

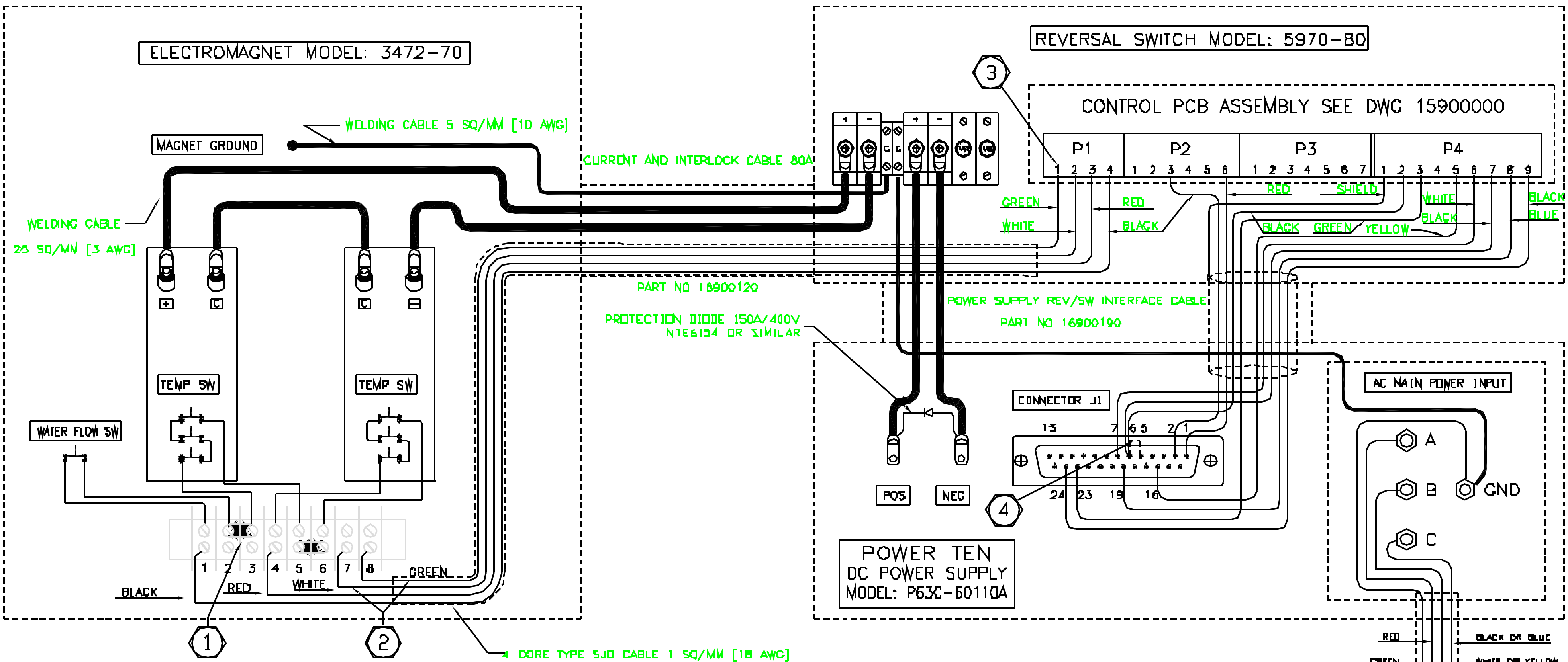
SIZE A1 DRAWING NO. 11900770 REV B
SCALE NTS WT kg SHEET 1 OF 1

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REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		05/16/97	G.DOUGLAS
B	CORRECT WIRING ERROR ON CONNECTOR J1		02/11/98	G.DOUGLAS
C	ADD PROTECTION DIODE		12/07/98	G.DOUGLAS
D	CORRECT WIRING ERROR @ B7		11/10/99	G.DOUGLAS



NOTE:

1. MAGNET WATER FLOW AND TEMP INTERLOCKS LINKED IN SERIES ON MAGNET
2. WHITE AND GREEN WATER FLOW INTERLOCK WIRES TIED TO TERM 7 & TERM 8. [not used]
3. WHITE AND GREEN WATER FLOW INTERLOCK WIRES TIED TO PINS 1 & PIN 2. [not used]
4. REMOVE LINK ON CONNECTOR J1 ON POWER SUPPLY. CONNECT WIRES AS SHOWN. [LINK MUST BE FITTED TO ENABLE POWER SUPPLY DC OUTPUT WITHOUT INTERLOCKS FITTED]

ELECTROMAGNET SYSTEM ELECTRICAL REQUIREMENTS			
AC INPUT POWER 3 PHASE, 48 to 62HZ	208V	-	-
AC INPUT FULL LOAD CURRENT	16	-	-
RECOMMENDED MAIN AC BREAKER	20	-	-
RECOMMENDED AC POWER OUTLET	L15-20R	-	-
RECOMMENDED AC CABLE SIZE	3 SQ/MM	-	-
NOTE: DRAWING SHOWS POWER SUPPLY FOR US 208V AC POWER			

REVERSAL SWITCH
INPUT POWER: 1PHASE 110V or 230V, 47HZ to 63HZ
FULL LOAD CURRENT: 110V/1.0AMPS or 230V/0.5AMPS

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

PARTS LIST

DRAWN G.DOUGLAS 11/19/97 — DO NOT SCALE FROM DRAWING

NEXT ASSY 3472-70 — SYSTEM

SOFTWARE AUTOCAD 13

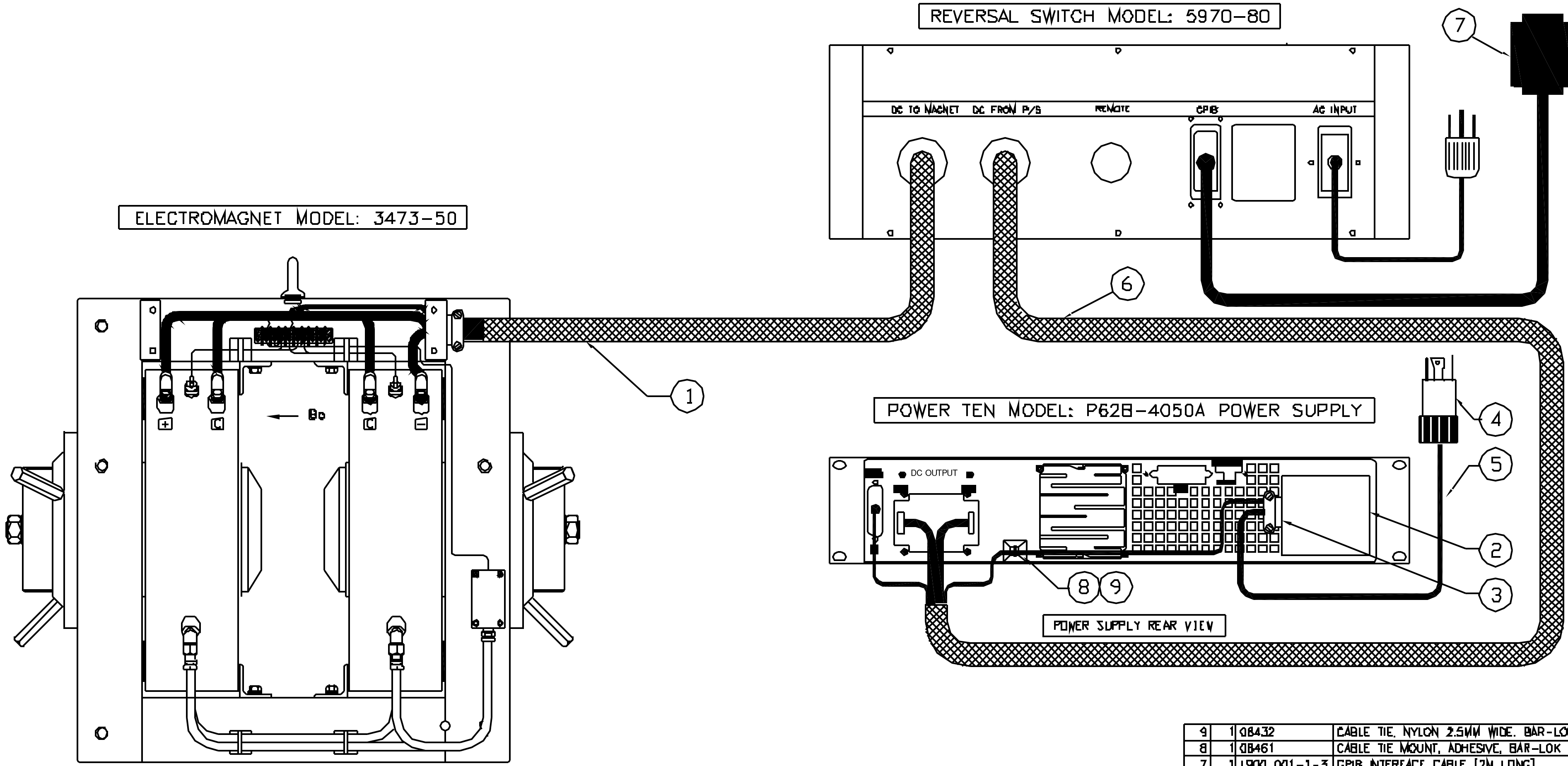
THIRD ANGLE PROJECTION

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TITLE: ELECTRICAL ASSY 3472-70/RS/P63

SIZE A1 — DRAWING NO. 13900270 — REV D

SCALE NTS — SHEET 1 OF 1



NOTE

1. POWER SUPPLY SHOWN WITH 2 PHASE 208V AC INPUT
2. REFER TO TABLE ON DWG 13900260 FOR AC INPUT RATINGS OTHER THAN 2 PHASE 208V.
3. ABOVE SYSTEM SHOWN WITH OPIONAL ADI AND GPIB CABLES

N/S=NOT SUPPLIED

*** WARNING ***

CHECK AC POWER VOLTAGE AND FREQUENCY MATCH POWER SUPPLY SPECIFIED REQUIREMENTS BEFORE APPLYING AC INPUT POWER

PARTS LIST

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
9	1	08432	CABLE TIE, NYLON 2.5MM WIDE, BAR-LOK	
8	1	08461	CABLE TIE MOUNT, ADHESIVE, BAR-LOK	
7	1	L900 001-1-3	GPIB INTERFACE CABLE [2M LONG]	N/S
6	1	16900180	REV/SW TO P62 INTERFACE CABLE	
5	1	4A-1203	POWER CORD, TYPE SO 3 CORE 12AWG	N/S
4	1	L15-20P	PLUG 3PHASE/20A, NYLON, BRYANT	N/S
3	1	3303	CABLE CLAMP, THOMAS & BETTS	
2	1	12900010	AC TERMINAL BOX	
1	1	16900110	CURRENT & INTERLOCK CABLE 60A	

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		05/19/97	G.DOUGLAS

DRAWN G.DOUGLAS DATE 05/16/97
CHECK
ENGINEERING
NEXT ASSY 3472-50
SOFTWARE AUTOCAD 13
DO NOT SCALE FROM DRAWING
THIRD ANGLE PROJECTION

GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (650)802-8292. Fax: (650)802-8298.

TITLE ELECTRICAL ASSY 3473-50/RS/P62

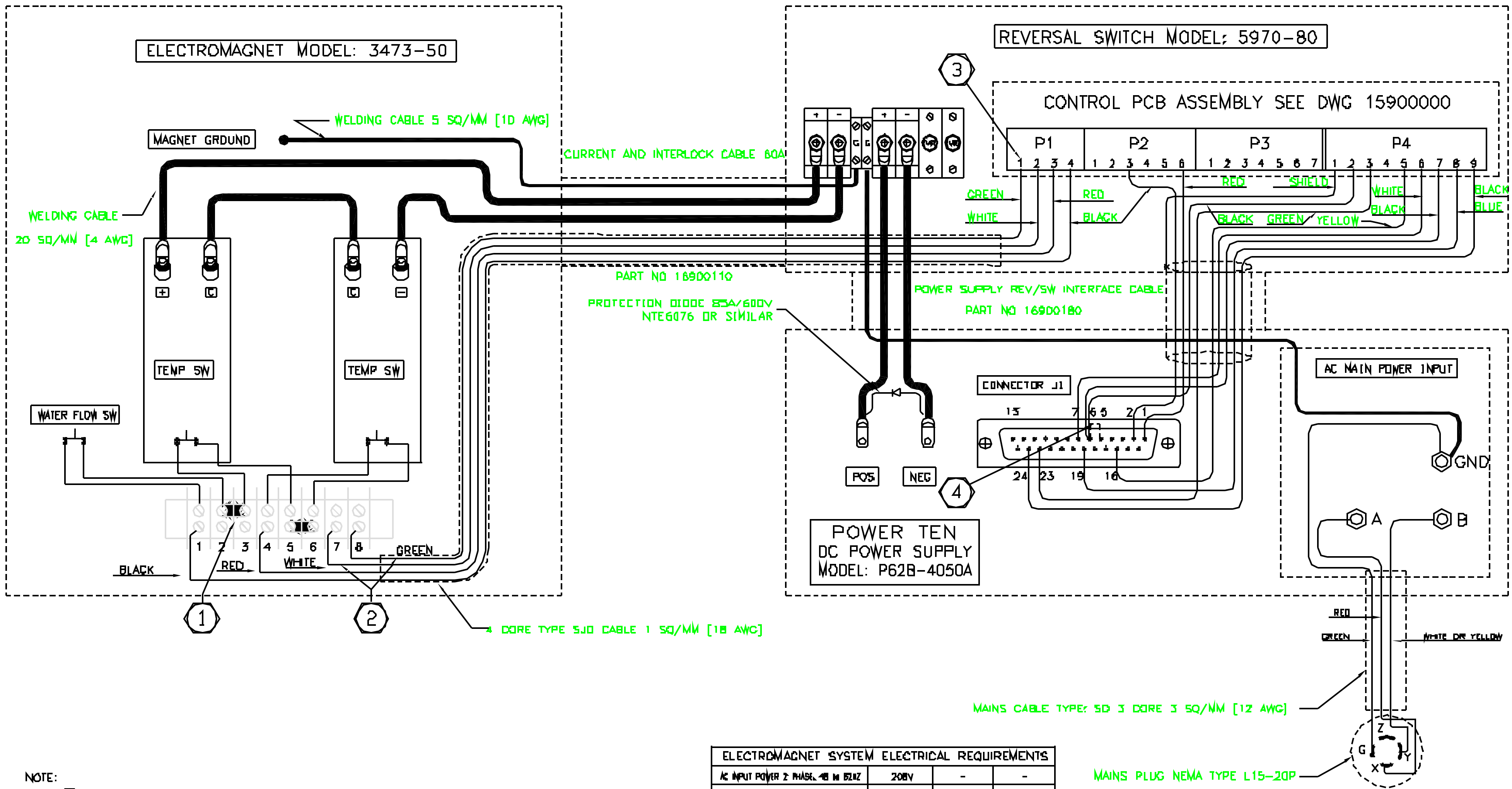
SIZE A1 DRAWING NO. 11900760 REV A

SCALE NTS SHEET 1 OF 1

MODEL: 597D-BO

PROPRIETARY

REVISIONS					
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		05/16/97	G.DOUGLAS
B	CORRECT WIRING ERROR ON CONNECTOR J1		02/11/98	G.DOUGLAS
C	ADD PROTECTION DIODE		12/07/98	G.DOUGLAS
D	CORRECT WIRING ERROR @ B7		11/10/99	G.DOUGLAS



NOTE:

1. MAGNET WATER FLOW AND TEMP INTERLOCKS LINKED IN SERIES ON MAGNET
2. WHITE AND GREEN WATER FLOW INTERLOCK WIRES TIED TO TERM 7 & TERM 8. [not used]
3. WHITE AND GREEN WATER FLOW INTERLOCK WIRES TIED TO PINS 1 & PIN 2. [not used]
4. REMOVE LINK ON CONNECTOR J1 ON POWER SUPPLY, CONNECT WIRES AS SHOWN. [LINK MUST BE FITTED TO ENABLE POWER SUPPLY DC OUTPUT WITHOUT INTERLOCKS CONNECTED]

ELECTROMAGNET SYSTEM ELECTRICAL REQUIREMENTS			
AC INPUT POWER 2 PHASE, 48 to 62HZ	208V	-	-
AC INPUT FULL LOAD CURRENT	16	-	-
RECOMMENDED MAIN AC BREAKER	20	-	-
RECOMMENDED AC POWER OUTLET	L15-20R	-	-
RECOMMENDED AC CABLE SIZE	3 SQ/MM	-	-
NOTE: DRAWING SHOWS POWER SUPPLY FOR US 208V AC POWER			

REVERSAL SWITCH
INPUT POWER: 1PHASE 110V or 230V, 47HZ to 63HZ
FULL LOAD CURRENT: 110V/1.0AMPS or 230V/0.5AMPS

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
PARTS LIST				

DRAWN G.DOUGLAS — DATE 11/18/97

DO NOT SCALE FROM DRAWING

NEXT ASSY 3472-50 — SYSTEM

SOFTWARE AUTOCAD 13

THIRD ANGLE PROJECTION

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TITLE: ELECTRICAL ASSY 3473-50/RS/P62

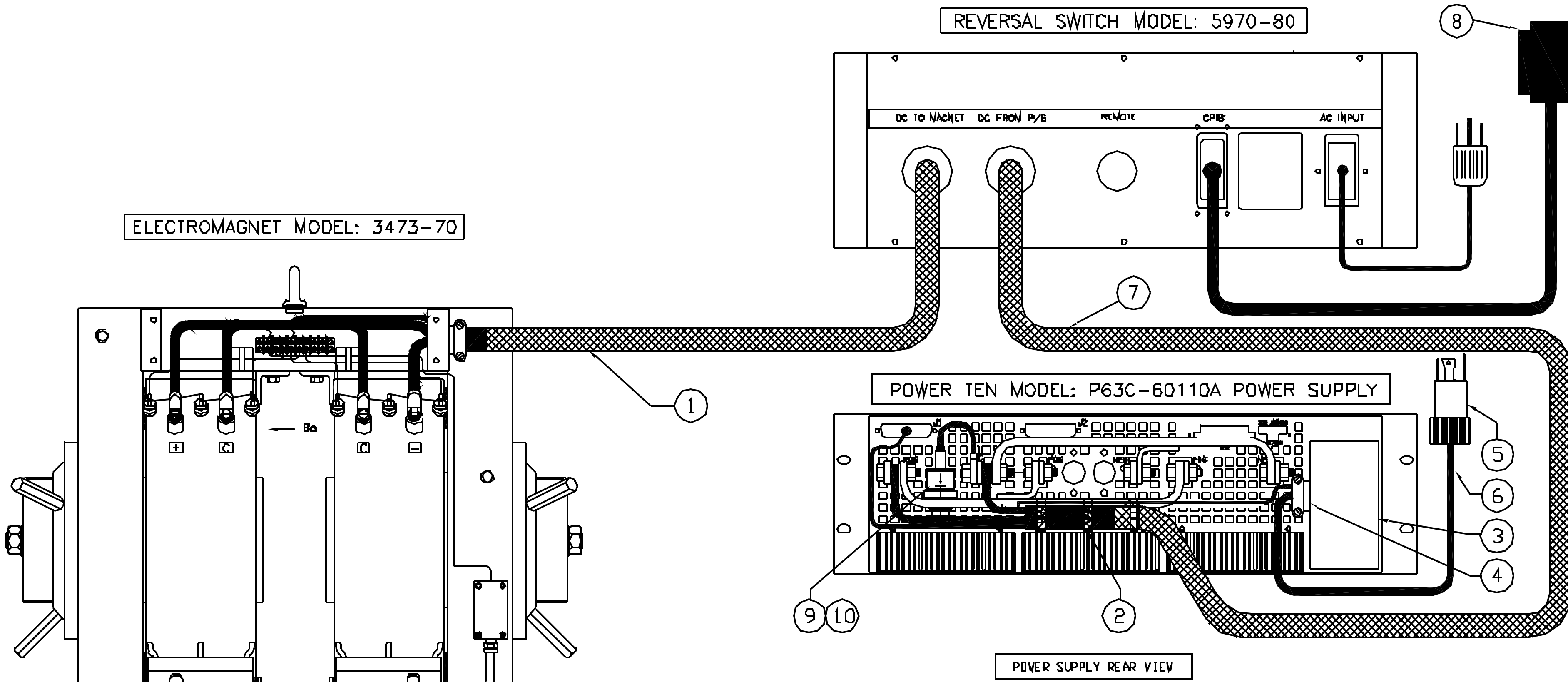
SIZE A1 — DRAWING NO. 13900260 — REV D

SCALE NTS — WT kg — SHEET 1 OF 1

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REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		05/16/97	G.DOUGLAS
B	ADD PROTECTION DIODE		12/07/98	G.DOUGLAS



*** WARNING ***
CHECK AC POWER VOLTAGE AND FREQUENCY MATCH POWER SUPPLY SPECIFIED REQUIREMENTS BEFORE APPLYING AC INPUT POWER

NOTE

1. POWER SUPPLY SHOWN WITH 3 PHASE 208V AC INPUT
2. REFER TO TABLE ON DWG 13900250 FOR AC INPUT RATINGS OTHER THAN 3 PHASE 208V.
3. ABOVE SYSTEM SHOWN WITH OPTIONAL ADI AND GPIB CABLES.

N/S=NOT SUPPLIED

PARTS LIST

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
10	1		HEATSHRINK 9mm 3/8" SLEEVING, BLACK	
9	1	NTE6154	RECTIFIER DIODE [Protection Diode] NTE	
8	1	L900 001-1-3	GPIB INTERFACE CABLE [2M LONG]	3
7	1	16900190	REV/SW TO P63C-60110A INTERFACE CABLE	
6	1	4A-1204	POWER CORD, TYPE SO 4 CORE 12AWG	N/S
5	1	L15-20P	PLUG 3PHASE/20A, NYLON, BRYANT	N/S
4	1	3303	CABLE CLAMP, THOMAS & BETTS	
3	1	12900000	AC TERMINAL BOX	
2	3	1D384	CABLE TIE, NYLON 5mm WIDE, BAR-LOK	
1	1	16900120	CURRENT & INTERLOCK CABLE 80A	

DRAWN G.DOUGLAS DATE 11/14/97
CHECK DATE
ENGINEERING DATE
NEXT ASSY 3473-70 SYSTEM
SOFTWARE AUTOCAD 13

DO NOT SCALE FROM DRAWING

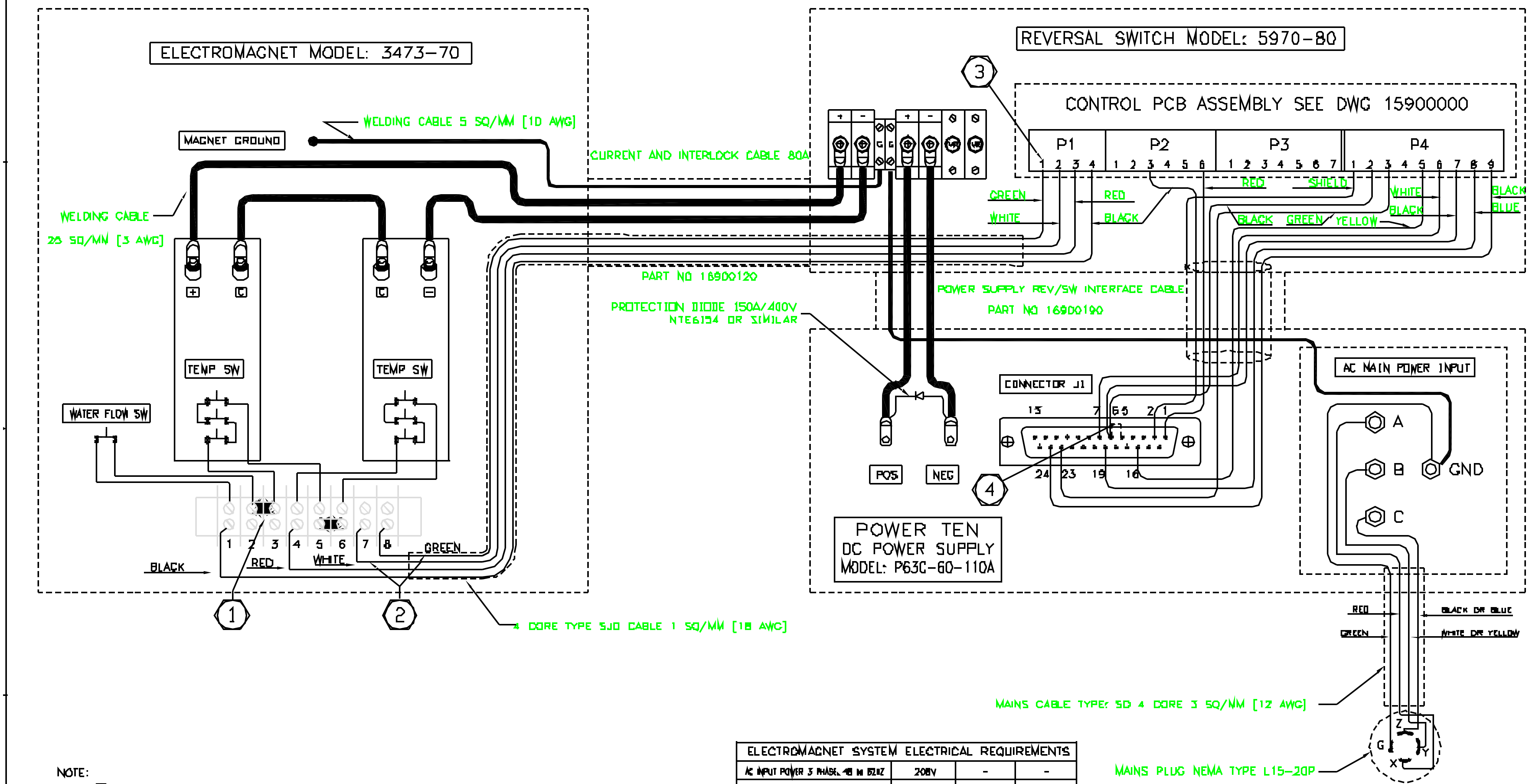
THIRD ANGLE PROJECTION

GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (650)802-8292, Fax: (650)802-8298.

TITLE
ELECTRICAL ASSY
3473-70/RS/P63

SIZE A1 DRAWING NO. 11900750 REV B
SCALE NTS WT kg SHEET 1 OF 1

REVISIONS					
REV	DESCRIPTION	DRAFT	DATE	APPROVED	
A	RELEASE		05/16/97	G.DOUGLAS	
B	CORRECT WIRING ERROR ON CONNECTOR J1		02/10/98	G.DOUGLAS	
C	ADD PROTECTION DIODE		12/07/98	G.DOUGLAS	
D	CORRECT WIRING ERROR @ B7		10/27/99	G.DOUGLAS	



NOTE:

1. MAGNET WATER FLOW AND TEMP INTERLOCKS LINKED IN SERIES ON MAGNET
2. WHITE AND GREEN WATER FLOW INTERLOCK WIRES TIED TO TERM 7 & TERM 8. [not used]
3. WHITE AND GREEN WATER FLOW INTERLOCK WIRES TIED TO PINS 1 & PIN 2. [not used]
4. REMOVE LINK ON CONNECTOR J1 ON POWER SUPPLY. CONNECT WIRES AS SHOWN. [LINK MUST BE FITTED TO ENABLE POWER SUPPLY DC OUTPUT WITHOUT INTERLOCKS CONNECTED]

ELECTROMAGNET SYSTEM ELECTRICAL REQUIREMENTS			
AC INPUT POWER 3 PHASE, 48 to 62HZ	208V	-	-
AC INPUT FULL LOAD CURRENT	18	-	-
RECOMMENDED MAIN AC BREAKER	20	-	-
RECOMMENDED AC POWER OUTLET	L15-20R	-	-
RECOMMENDED AC CABLE SIZE	3 SQ/MM	-	-
NOTE: DRAWING SHOWS POWER SUPPLY FOR US 208V AC POWER			

REVERSAL SWITCH
INPUT POWER: 1PHASE 110V or 230V, 47HZ to 63HZ
FULL LOAD CURRENT: 110V/1.0AMPS or 230V/0.5AMPS

ITEM | QTY | PART NUMBER | DESCRIPTION | NOTE
PARTS LIST

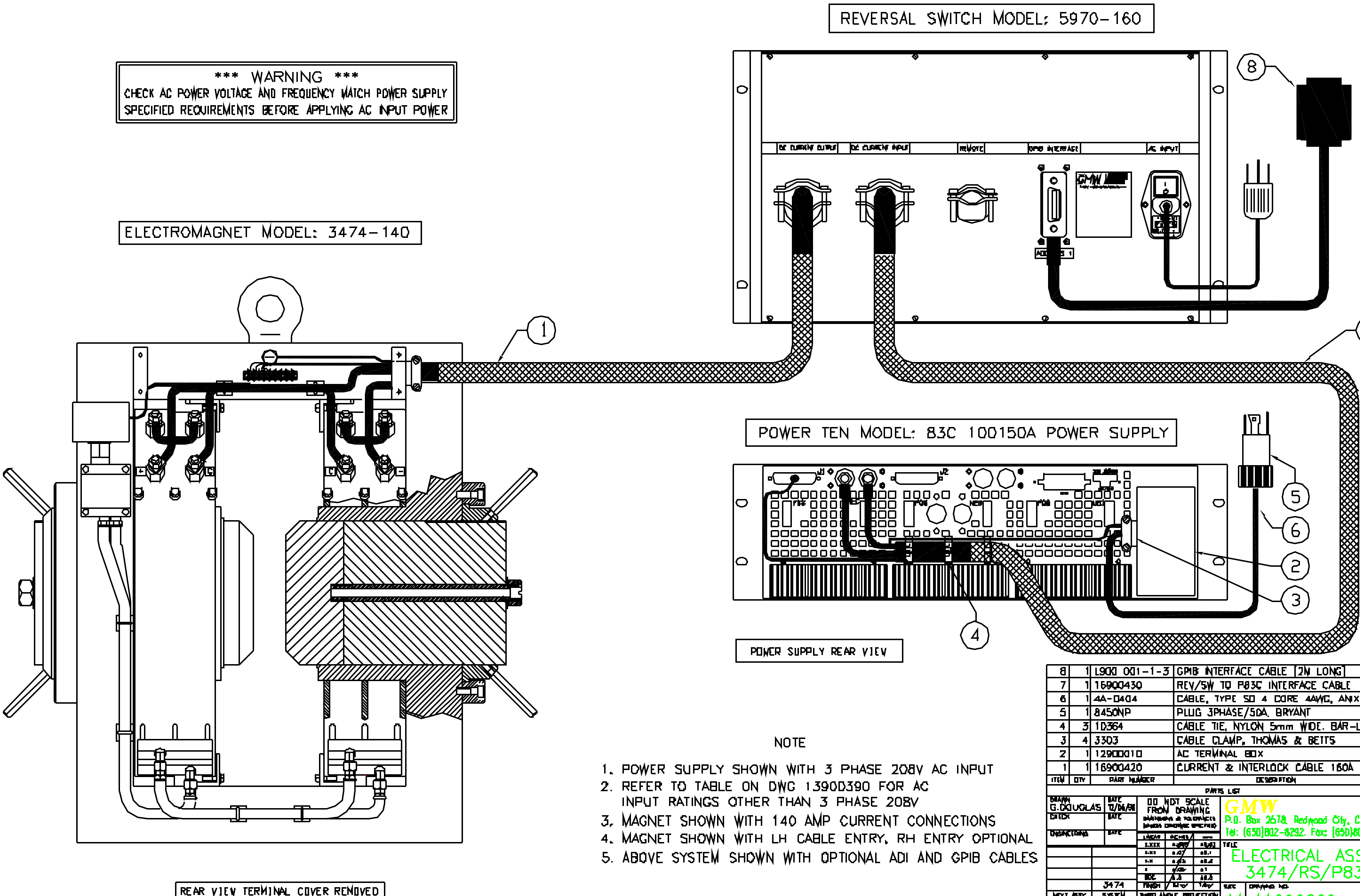
DRAWN G.DOUGLAS DATE 05/16/97
CHECK DATE
ENGINEERING DATE
DO NOT SCALE FROM DRAWING
NEXT ASSY 3473-70 SYSTEM
SOFTWARE AUTOCAD 13
THIRD ANGLE PROJECTION

GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (650)802-8292, Fax: (650)802-8298

TITLE ELECTRICAL ASSY 3473-70/RS/P63
SIZE A1 DRAWING NO. 13900250 REV D
SCALE NTS WT kg SHEET 1 OF 1

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		12/08/98	G.DOUGLAS

*** WARNING ***
CHECK AC POWER VOLTAGE AND FREQUENCY MATCH POWER SUPPLY SPECIFIED REQUIREMENTS BEFORE APPLYING AC INPUT POWER



NOTE

1. POWER SUPPLY SHOWN WITH 3 PHASE 208V AC INPUT
2. REFER TO TABLE ON DWG 13900390 FOR AC INPUT RATINGS OTHER THAN 3 PHASE 208V
3. MAGNET SHOWN WITH 140 AMP CURRENT CONNECTIONS
4. MAGNET SHOWN WITH LH CABLE ENTRY, RH ENTRY OPTIONAL
5. ABOVE SYSTEM SHOWN WITH OPTIONAL ADI AND GPIB CABLES

N/S = NOT SUPPLIED

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
8	1	L900 001-1-3	GPIB INTERFACE CABLE [2M LONG]	3
7	1	16900430	REV/SW TO P83C INTERFACE CABLE	
6	1	4A-0404	CABLE, TYPE SO 4 CORE 4AWG, ANIXTER	N/S
5	1	8450NP	PLUG 3PHASE/50A, BRYANT	N/S
4	3	1D364	CABLE TIE, NYLON 5mm WIDE, BAR-LOK	
3	4	3303	CABLE CLAMP, THOMAS & BETTS	
2	1	12900010	AC TERMINAL BOX	
1	1	16900420	CURRENT & INTERLOCK CABLE 160A	

PARTS LIST

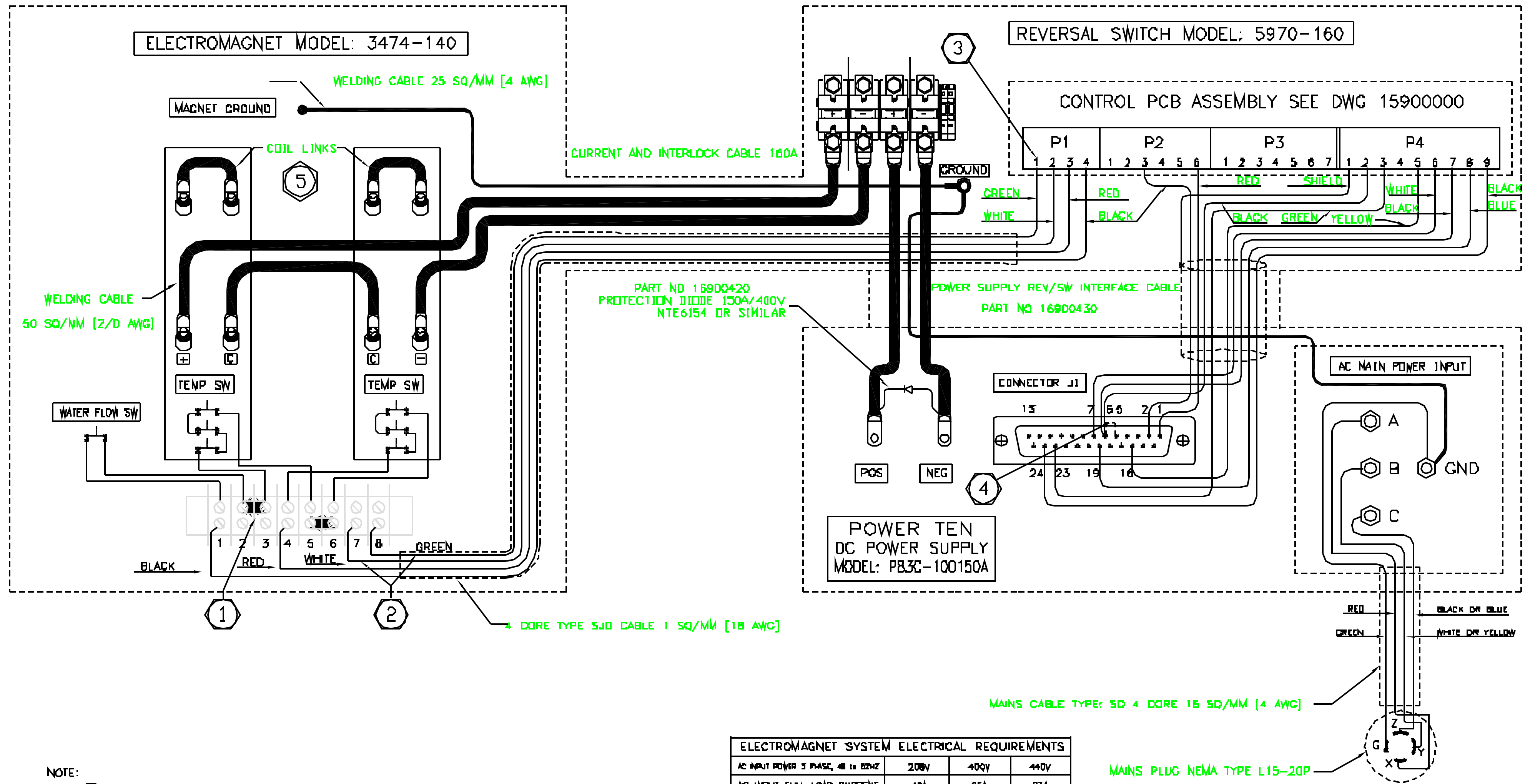
DRAWN G.DOUGLAS 12/08/98 — CHECK — ENGINEERING
DO NOT SCALE FROM DRAWING
NEXT ASSY 3474 — SYSTEM
SOFTWARE AUTOCAD 13
THIRD ANGLE PROJECTION

GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (650)802-8292 Fax: (650)802-8298

TITLE: ELECTRICAL ASSEM 3474/RS/P83C

SIZE A1 — DRAWING NO. 11900860 — REV A
SCALE NTS — WT kg — SHEET 1 OF 1

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		12/08/98	G.DOUGLAS



NOTE:

1. MAGNET WATER FLOW AND TEMP INTERLOCKS LINKED IN SERIES ON MAGNET
2. WHITE AND GREEN WATER FLOW INTERLOCK WIRES TIED TO TERM 7 & TERM 8. [not used]
3. WHITE AND GREEN WATER FLOW INTERLOCK WIRES TIED TO PINS 1 & PIN 2. [not used]
4. REMOVE LINK ON CONNECTOR J1 ON POWER SUPPLY. CONNECT WIRES AS SHOWN. [LINK MUST BE FITTED TO ENABLE POWER SUPPLY DC OUTPUT WITHOUT INTERLOCKS CONNECTED]
5. COIL LINKS SHOWN WITH SERIES CONNECTION. SEE DWG NO 11801600 FOR DETAILS

ELECTROMAGNET SYSTEM ELECTRICAL REQUIREMENTS			
AC INPUT POWER 3 PHASE, 48 to 62HZ	208V	400V	440V
AC INPUT FULL LOAD CURRENT	48A	25A	23A
RECOMMENDED MAIN AC BREAKER	50A	30A	30A
RECOMMENDED AC POWER OUTLET	15-50P	-	-
RECOMMENDED AC CABLE SIZE	16 SQ/MM	8 SQ/MM	8 SQ/MM
NOTE: DRAWING SHOWS POWER SUPPLY FOR US 3 PHASE 208V AC POWER			

REVERSAL SWITCH
INPUT POWER: 1PHASE 110V or 230V, 47HZ to 63HZ
FULL LOAD CURRENT: 110V/1.0AMPS or 230V/0.5AMPS

PARTS LIST

DRAWN G.DOUGLAS 12/08/98

DO NOT SCALE FROM DRAWING

GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (650)802-8292 Fax: (650)802-8298

TITLE: ELECTRICAL ASSY 3474/RS/P63

NEXT ASSY 3474 SYSTEM

SOFTWARE AUTOCAD 13

A1 13900390 REV A

SCALE NTS SHEET 1 OF 1

PROPRIETARY

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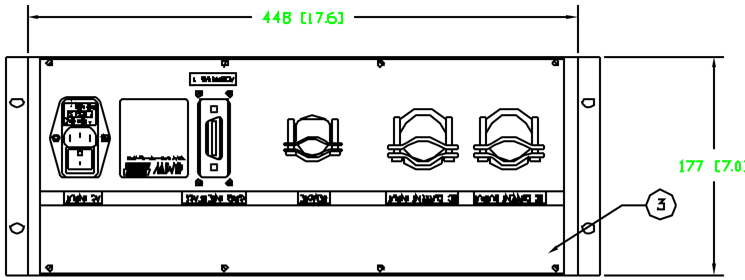
REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		[illegible]	G.DOUGLAS
B	ADD ITEM 16, CHANGE ITEM 14		06/22/00	G.DOUGLAS

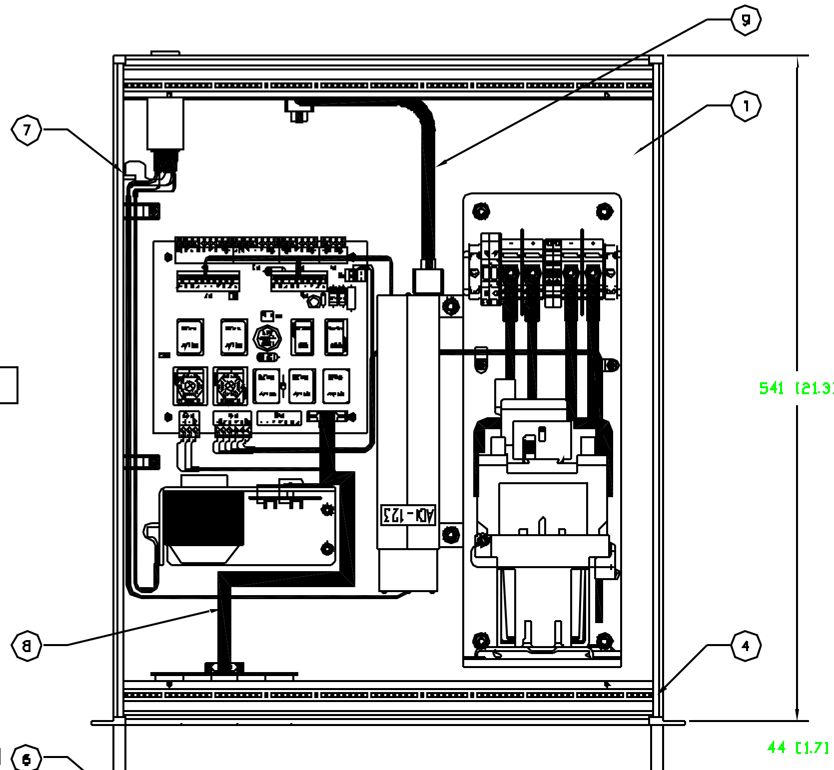
WHEN INTERNAL ADI IS FITTED TO REVERSAL SWITCH USE DWG NO 11900561

WHEN INTERNAL ADI IS OMITTED ON REVERSAL SWITCH USE DWG NO 11900562

REAR VIEW

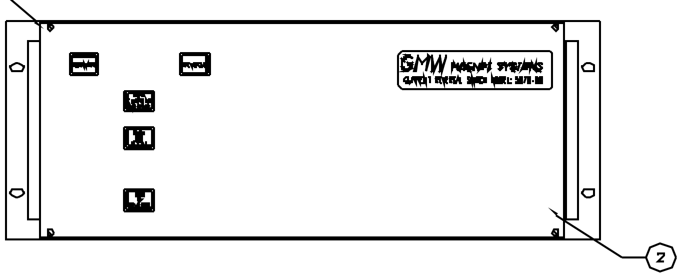


TOP VIEW

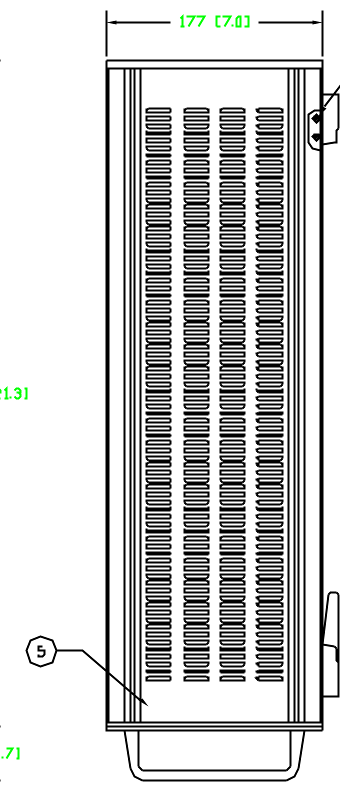


BEHIND PANELS [4 PLS] 6

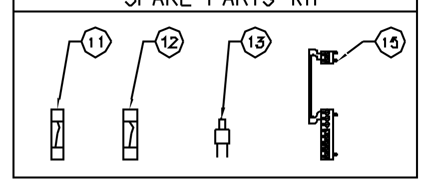
FRONT VIEW

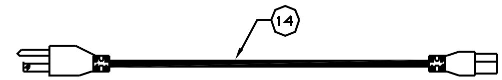


SIDE VIEW



SPARE PARTS KIT





NOTE: POWER CORDSET SHOWN FOR US/CANADA. SEE TABLE FOR POWER CORDSET SUITABLE FOR OTHER COUNTRIES

REVERSAL SWITCH POWER CORDSETS

COUNTRY	RATING	MANUFACTURER AND PART NUMBER
USA/CANADA	115V/13A	PANEL COMPONENTS PART NO 70403020305
EUROPE	250/16A	PANEL COMPONENTS PART NO 86235000
UK/INDIA	230V/13A	PANEL COMPONENTS PART NO 86395090
ARGENTINA	220V/10A	PANEL COMPONENTS PART NO 86390010
SWITZERLAND	230V/10A	PANEL COMPONENTS PART NO 86396000
ITALY	230V/10A	PANEL COMPONENTS PART NO 86394000

PARTS LIST

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
16	12	19D4-12	SCREW, M4 x 10 LOW PROFILE HD, ELMA	
15	1	16900340	PCB 24 V POWER LINK	
14	1	70403020305	POWER CORDSET, PANEL COMPONENTS	
13	2	AT607-12V	LAMP 12 V, NKK	
12	2	239001	FUSE LINK 1.0 A SLO BLO LITTLEFUSE	
11	2	129.500	FUSE LINK 0.5A SLO BLO LITTLEFUSE	
10	8	63-027	BASE PLATE, ELMA	
9	1	CIF24-05M	CABLE, GPIB 0.5M LONG L-COM	
8	1	FRC10-0.5M	CABLE, RIBBON 10 WAY 0.5M LONG	
7	1	63-172	EARTHING KIT, ELMA	
6	4	63-068	TAPPED STRIP 2 x 6, M3 HOLES ELMA	
5	1	14Y147-10	COVER PLATE KIT GREY, ELMA	
4	1	148047	CASE, RACK MTG 4U [with handles] ELMA	
3	1	11900601	BACK PANEL ASSEMBLY	
2	1	11900590	FRONT PANEL ASSEMBLY	
1	1	11900571	BASE PLATE ASSEMBLY	

DRAWN G.DOUGLAS DATE [illegible]
CHECK DATE
ENGINEERING DATE
5970-[illegible]
NEXT ASSY SYSTEM
SOFTWARE AUTOCAD 13

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)
THIRD ANGLE PROJECTION

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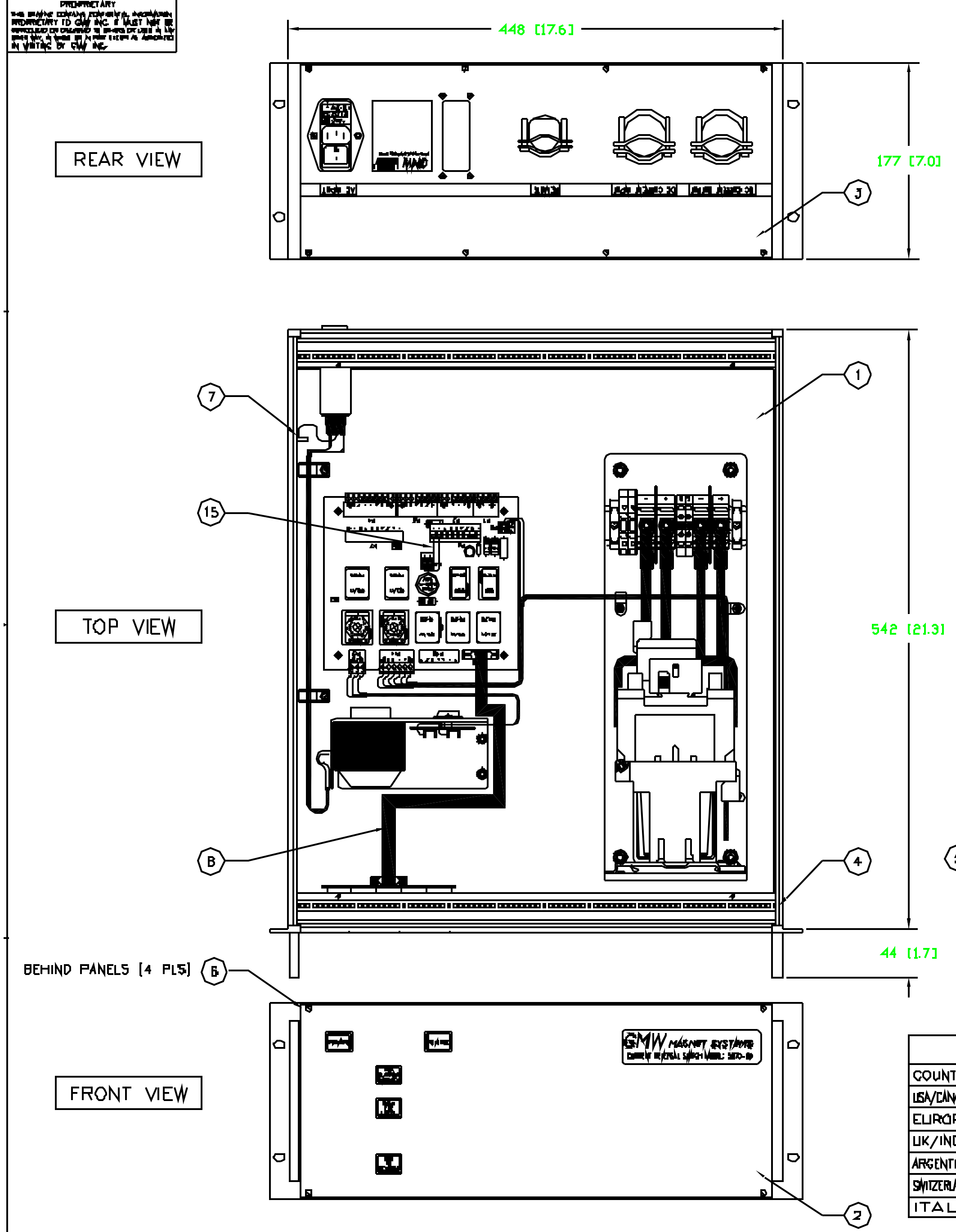
TITLE
REVERSAL SWITCH
GENERAL ASSEMBLY

SIZE A1 DRAWING NO. 11900561 REV B
SCALE 1:2 WT kg SHEET 1 OF 1

PROPRIETARY

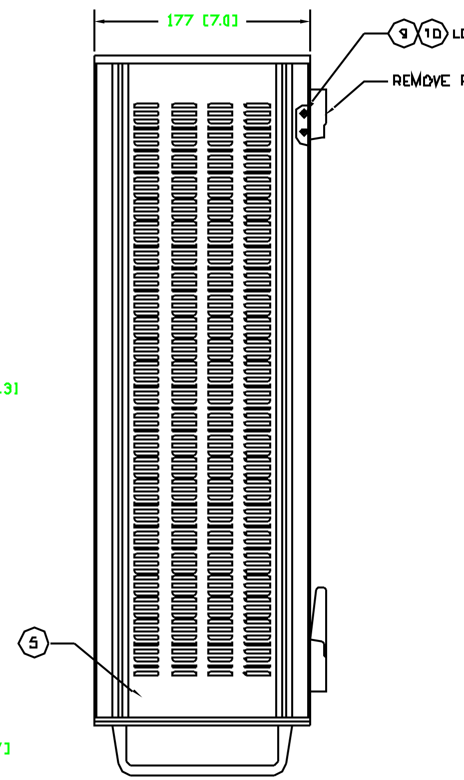
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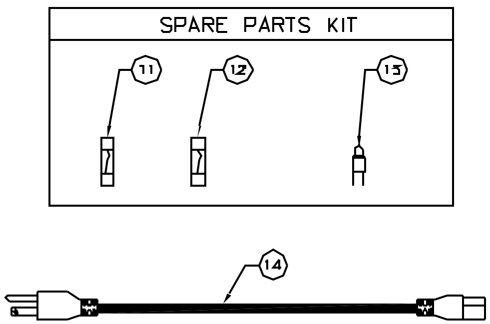
		REVISIONS			
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		11/26/98	G.DOUGLAS
B	CHANGE PARTS LIST, AND ITEMS 9, 10		03/22/00	G.DOUGLAS



WHEN INTERNAL ADI IS FITTED TO REVERSAL SWITCH USE DWG NO 11900561

WHEN INTERNAL ADI IS OMITTED ON REVERSAL SWITCH USE DWG NO 11900562





NOTE: POWER CORDSET SHOWN FOR US/CANADA. SEE TABLE FOR POWER CORDSET SUITABLE FOR OTHER COUNTRIES

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
15	1	16900340	PCB 24 V POWER LINK	
14	1	70403020305	POWER CORDSET, PANEL COMPONENTS	
13	2	AT607-12V	LAMP 12 V, NKK	
12	2	239001	FUSE LINK 1.0 A SLO BLO LITTLEFUSE	
11	2	129,500	FUSE LINK 0.5A SLO BLO LITTLEFUSE	
10	8	63-027	BASE PLATE, ELMA	
9	12	1904-12	SCREW, M4 x 10 LOW PROFILE HD, ELMA	
8	1	FRC10-0.5M	CABLE, RIBBON 10 WAY 0.5M LONG	
7	1	63-172	EARTHING KIT, ELMA	
6	4	63-068	TAPPED STRIP 2 x 6, M3 HOLES ELMA	
5	1	14Y147-10	COVER PLATES, 4U SLOTTED GREY ELMA	
4	1	148147	CASE, RACK MTG 4U [with handles] ELMA	
3	1	11900602	BACK PANEL ASSEMBLY	
2	1	11900590	FRONT PANEL ASSEMBLY	
1	1	11900572	BASE PLATE ASSEMBLY	

PARTS LIST

REVERSAL SWITCH POWER CORDSETS

COUNTRY	RATING	MANUFACTURER AND PART NUMBER
USA/CANADA	115V/13A	PANEL COMPONENTS PART NO 70403020305
EUROPE	250/16A	PANEL COMPONENTS PART NO 86235000
UK/INDIA	230V/13A	PANEL COMPONENTS PART NO 86395090
ARGENTINA	220V/10A	PANEL COMPONENTS PART NO 86390010
SWITZERLAND	230V/10A	PANEL COMPONENTS PART NO 86396000
ITALY	230V/10A	PANEL COMPONENTS PART NO 86394000

DRAWN G.DOUGLAS DATE 11/26/98
CHECK DATE
ENGINEERING DATE

DO NOT SCALE FROM DRAWING

NEXT ASSY 5970-80 SYSTEM

SOFTWARE AUTOCAD 13

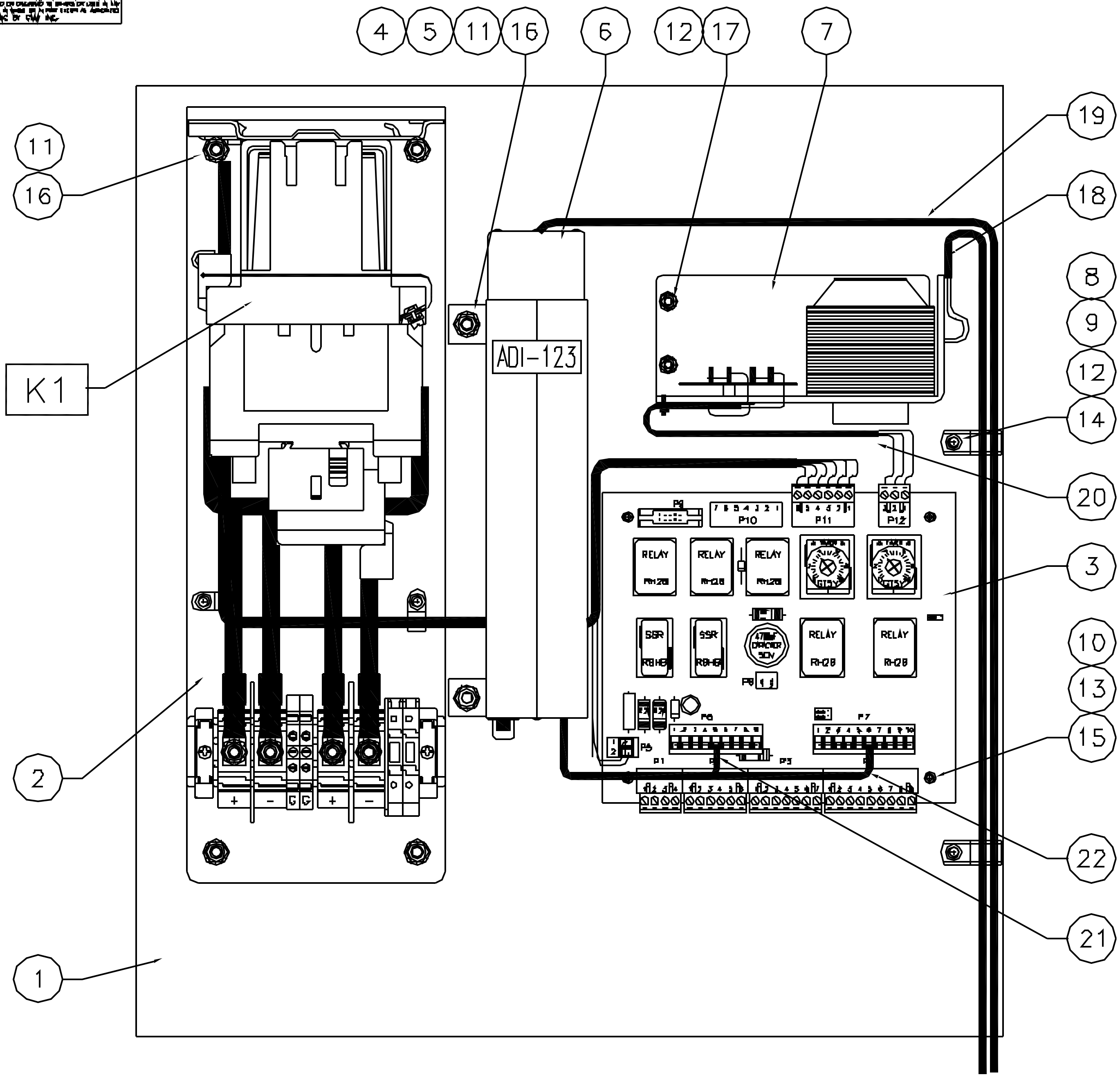
THIRD ANGLE PROJECTION

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TITLE: REVERSAL SWITCH GENERAL ASSEMBLY

SIZE A1 DRAWING NO. 11900562 REV B

SCALE 1:2 WT kg SHEET 1 OF 1



Rev	Description	Draft	Date	Approved
A	RELEASE		11/28/98	G.DOUGLAS

∴ WHEN INTERNAL ADI IS FITTED TO REVERSAL SWITCH USE DWG NO 11900571

∴ WHEN INTERNAL ADI IS OMITTED ON REVERSAL SWITCH USE DWG NO 11900572

Item	Qty	Part Number	Description	Note
22	1	5008C	CABLE, 8 CORE 22 AWG. ALPHA	
21	1	5008C	CABLE, 8 CORE 22 AWG ALPHA	
20	1	5053C	CABLE, 3 CORE 20 AWG ALPHA	
19	1	5056C	CABLE, 6 CORE 20 AWG ALPHA	
18	1	5056C	CABLE, 6 CORE 20 AWG ALPHA	
17	4		KEPNUT, M4 S/S	
16	8		KEPNUT, M6 S/S	
15	4	DIN 6797	WASHER, M3 INT LOCK S/S	
14	2	DIN 6797	WASHER, M4 INT LOCK S/S	
13	4	DIN 125 A	WASHER, M3 FLAT S/S	
12	2	DIN 125 A	WASHER, M4 FLAT S/S	
11	6	DIN 125 A	WASHER, M6 FLAT S/S	
10	4	DIN 7985A	SCREW, M3 x 16 PAN HD S/S	
9	2	DIN 7985A	SCREW, M4 x 8 PAN HD S/S	
8	2	ECC8	CABLE CLAMP	
7	1	HC24-2.4A	POWER SUPPLY 24V CONDOR	
6	1	ADI-123	ANALOG DEVICE INTERFACE, GROUP3	
5	1	17900680	ADI MOUNTING STUDS	
4	2	17900670	ADI MOUNTING BRACKETS	
3	1	15900000	MAIN CONTROL BOARD	
2	1	11900580	CONTACTOR ASSEMBLY 80 AMP	
1	1	17900930	BASE PLATE	

PARTS LIST

DRAWN	G.DOUGLAS 11/28/98
CHECK	
ENGINEERING	
NEXT ASSY	11900561
SYSTEM	5970-80
SOFTWARE	AUTOCAD 13

DO NOT SCALE FROM DRAWING

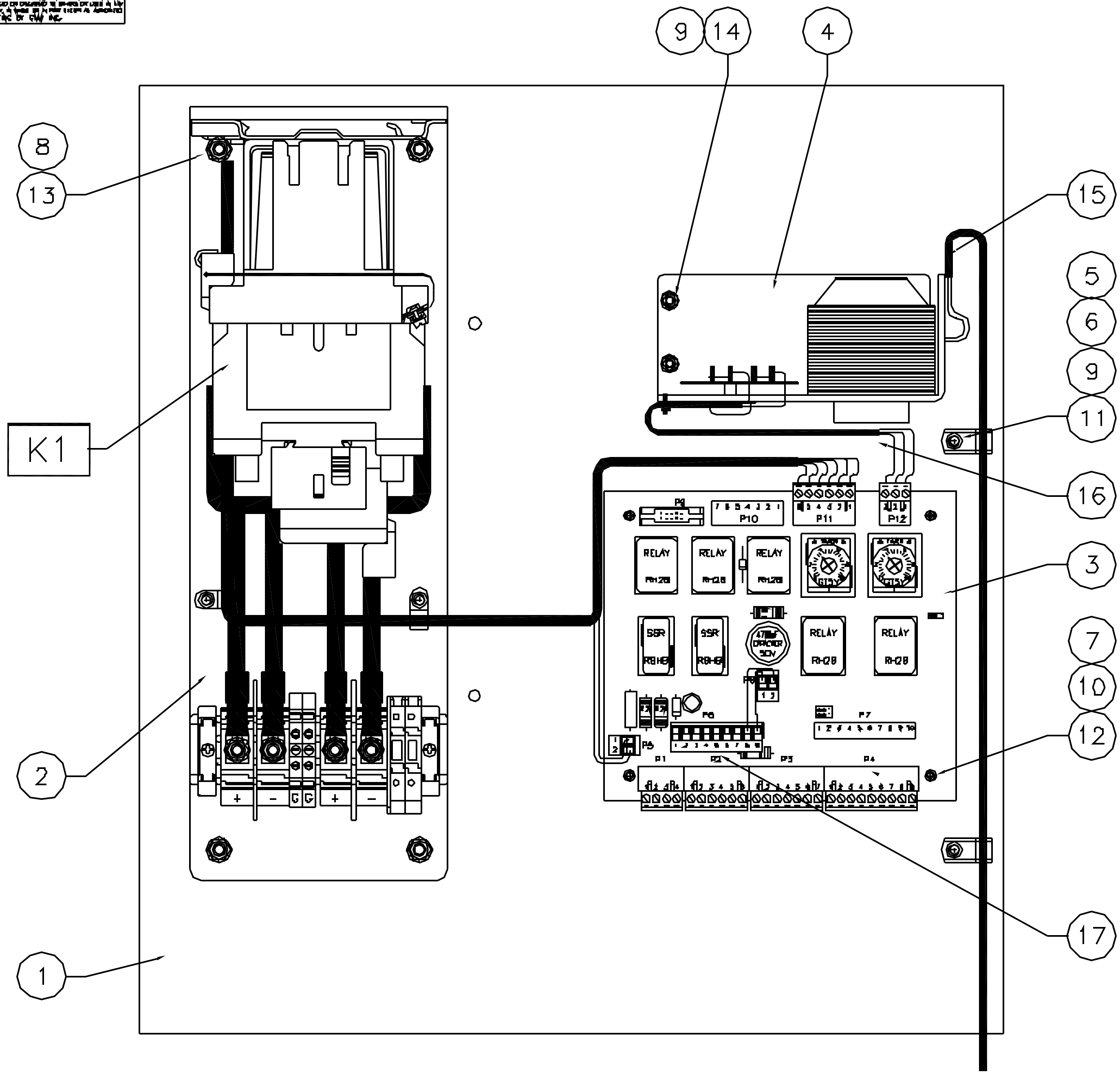
THIRD ANGLE PROJECTION

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TITLE: REVERSAL SWITCH BASE PLATE ASSY

SIZE: A1 DRAWING NO: 11900571 REV: A

SCALE 1:1 WT kg SHEET 1 OF 1



. . WHEN INTERNAL ADI IS FITTED TO REVERSAL SWITCH USE DWG NO 11900571

. . WHEN INTERNAL ADI IS OMITTED ON REVERSAL SWITCH USE DWG NO 11900572

PARTS LIST

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
17	1	1690034	PCB 24 V POWER LINK	
16	1	5053C	CABLE, 3 CORE 20 AWG ALPHA	
15	1	5056C	CABLE, 6 CORE 20 AWG ALPHA	
14	4		KEPNUT, M4 S/S	
13	4		KEPNUT, M6 S/S	
12	4	DIN 6797	WASHER, M3 INT LOCK S/S	
11	2	DIN 6797	WASHER, M4 INT LOCK S/S	
10	4	DIN 125 A	WASHER, M3 FLAT S/S	
9	6	DIN 125 A	WASHER, M4 FLAT S/S	
8	4	DIN 125 A	WASHER, M6 FLAT S/S	
7	4	DIN 7985A	SCREW, M3 X 12 PAN HD S/S	
6	2	DIN 7985A	SCREW, M4 X 8 PAN HD S/S	
5	2	CCC4	CABLE CLAMP	
4	1	HC24-2.4A	POWER SUPPLY 24V CONDOR	
3	1	15900000	MAIN CONTROL BOARD	
2	1	11900580	CONTACTOR ASSEMBLY 80 AMP	
1	1	17900930	BASE PLATE	

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		11/28/98	G.DOUGLAS

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CHECK DATE

ENGINEERING DATE

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TITLE

REVERSAL SWITCH BASE PLATE ASSY

NEXT ASSY 11900562 SYSTEM 5970-80

SOFTWARE AUTOCAD 13

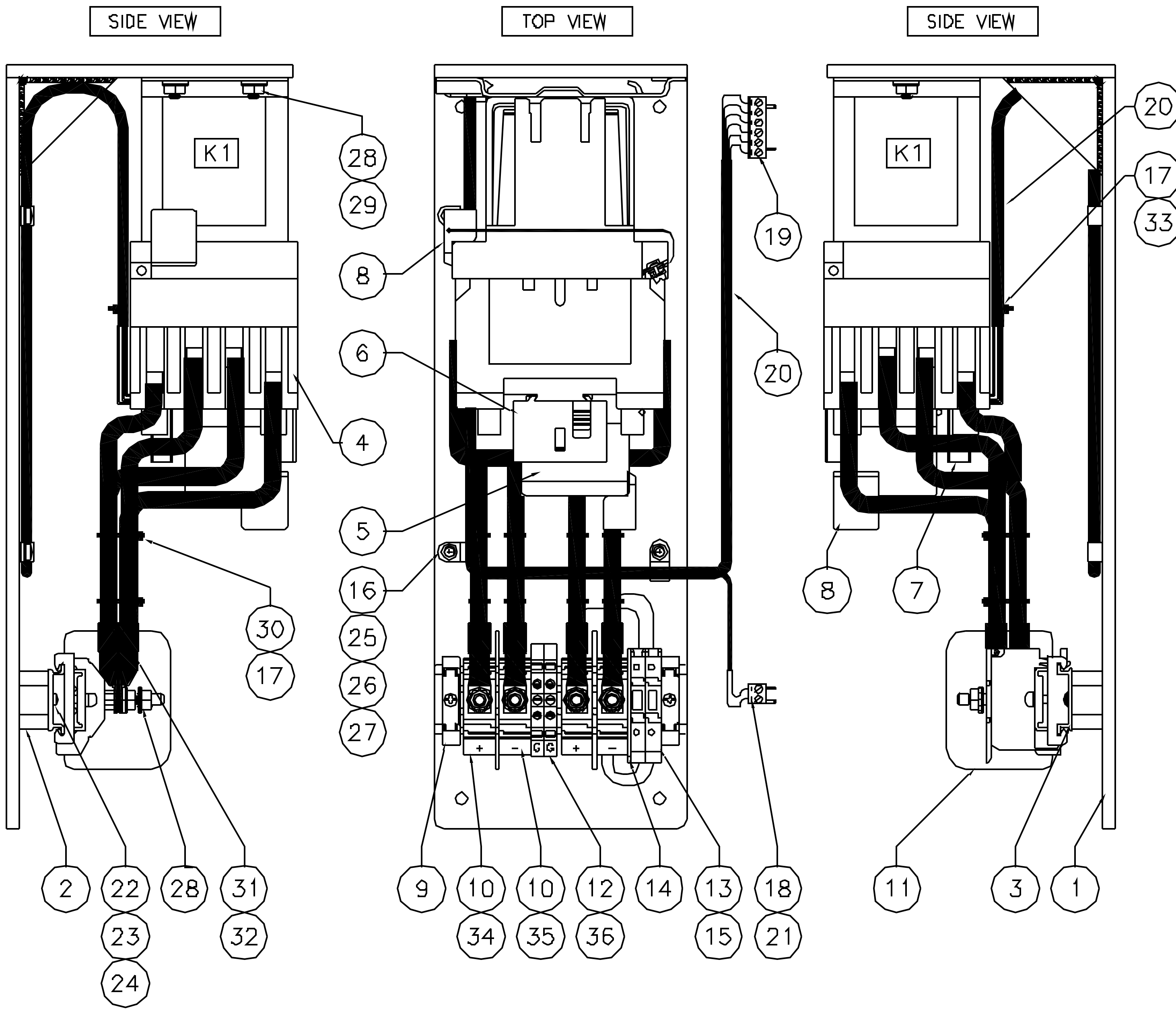
THIRD ANGLE PROJECTION

SIZE A1 DRAWING NO. 11900572 REV A

SCALE 1:1 Wt kg SHEET 1 OF 1

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REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		11/26/98	G.DOUGLAS



REVERSAL SWITCH
80 AMP CONTACTOR ASSY
USE DWG NO 11900580

REVERSAL SWITCH
160 AMP CONTACTOR ASSY
USE DWG NO 11900630

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
36	2		LABEL, GROUND	
35	2		LABEL, NEGATIVE	
34	2		LABEL, POSITIVE	
33	2		TIE PAD, ADHESIVE MOUNT	
32	A/R		SLEEVING, HEATSHRINK 10mm 3/8" BLACK	
31	8	PV6-14RX-E	LUG, 6 AWG M6 HOLE PANDUIT	
30	A/R	5J-0601	CABLE, 6 AWG WELDING BLACK ANIXTER	
29	3	DIN 125A	WASHER, FLAT M6 S/S	
28	7		KEPNUT, M6	
27	3	DIN 6797	WASHER, M4 INT LOCK S/S	
26	3	DIN 125 A	WASHER, M4 FLAT S/S	
25	3	DIN 7985A	SCREW, M4 X 10 PAN HD S/S	
24	3	DIN 6797	WASHER, M3 INT LOCK S/S	
23	3	DIN 125 A	WASHER, M3 FLAT S/S	
22	3	DIN 7985A	SCREW, M3 X 10 PAN HD S/S	
21	1		CABLE, 2 CORE	
20	1		CABLE, 6 CORE	
19	1	1757051	PLUG, 6 WAY PHOENIX	
18	1	1757019	PLUG 2 WAY, PHOENIX	
17	9	PLT2M-C	CABLE TIE, MINIATURE PANDUIT	
16	3		CABLE CLAMP	
15	2	239002	FUSE LINK, 2 AMP 20x5mm LITTLEFUSE	
14	1	3803.6	PARTITION, ASK1 WEIDMULLER	
13	2	4745.6	FUSE TERMINAL, ASK1 WEIDMULLER	
12	2	6611.6	GROUND TERMINAL, WEIDMULLER	
11	2	6071.0	PARTITION, WEIDMULLER	
10	4	6498.2	STUD TERMINAL, M6 WEIDMULLER	
9	2	BNL-5	CLAMPS, DIN RAIL IDEC	
8	2	LA4-DC3U	COIL SUPRESSOR, TELEMECANIQUE	
7	1	LA1-DN01	AUX CONTACT NC, TELEMECANIQUE	
6	1	LA1-DN10	AUX CONTACT NO, TELEMECANIQUE	
5	1	LA6-DK10B	CONTACTOR, LATCH TELEMECANIQUE	
4	1	LP1-D65008-BD	CONTACTOR, 2NC/2NO TELEMECANIQUE	
3	1	BNDN1000	DIN RAIL, ALUMINUM IDEC	
2	5	17900970	STANDOFF	
1	1	17900940	CONTACTOR MOUNTING BRACKET	

PARTS LIST

DRAWN G.DOUGLAS DATE 11/26/98
CHECK DATE
ENGINEERING DATE
DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES UNLESS OTHERWISE SPECIFIED
11900570 5970-80 NEXT ASSY SYSTEM
SOFTWARE AUTOCAD 13
THIRD ANGLE PROJECTION

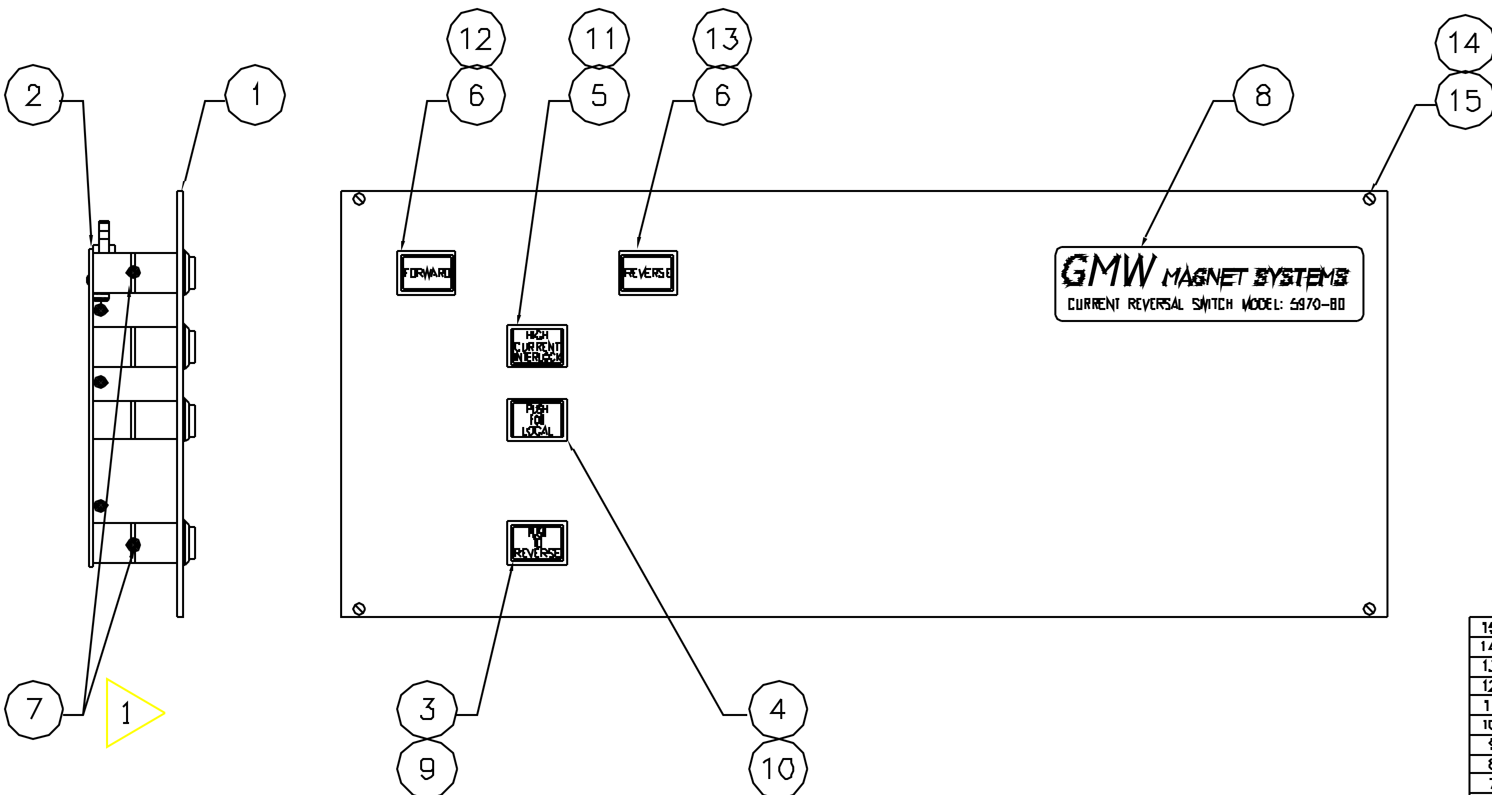
GMW
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TITLE
REVERSAL SWITCH
CONTACTOR ASSY

SIZE A1 DRAWING NO. 11900580 REV A
SCALE 1:1 WT kg SHEET 1 OF 1

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		11/13/98	G.DOUGLAS



NOTE:

1. APPLY RTV TO FOLLOWING PLACES
BOTH SIDES OF ITEM 3
OUTSIDE SURFACE OF FORWARD INDICATOR
OUTSIDE SURFACE OF REVERSE INDICATOR

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
15	4	63-119	SCREWS, RETAINING ELMA	
14	4	63-301	BUSHINGS, ELMA	
13	1		LABEL, REVERSE	
12	1		LABEL, FORWARD	
11	1		LABEL, HIGH CURRENT INTERLOCK	
10	1		LABEL, PUSH for LOCAL	
9	1		LABEL, PUSH to REVERSE	
8	1		LABEL, MODEL NUMBER	
7	A/R	DOW.CORN 3145	RTV ADHESIVE, NON CORROSIVE	
6	2	LB03KW01128J	INDICATOR, YELLOW LENS NKK	
5	1	LB03KW01128J	INDICATOR, WHITE LENS NKK	
4	1	LB26RKWD1128J	PUSHBUTTON, LATCH WHITE LENS NKK	
3	1	LB25RKWD112FJ	PUSHBUTTON, MOMENTARY GREEN LENS NKK	
2	1	15900010	FRONT PANEL PCB ASSEMBLY	
1		17900950	FRONT PANEL	

PARTS LIST

DRAWN G.DOUGLAS DATE 11/13/98
CHECK DATE
ENGINEERING DATE

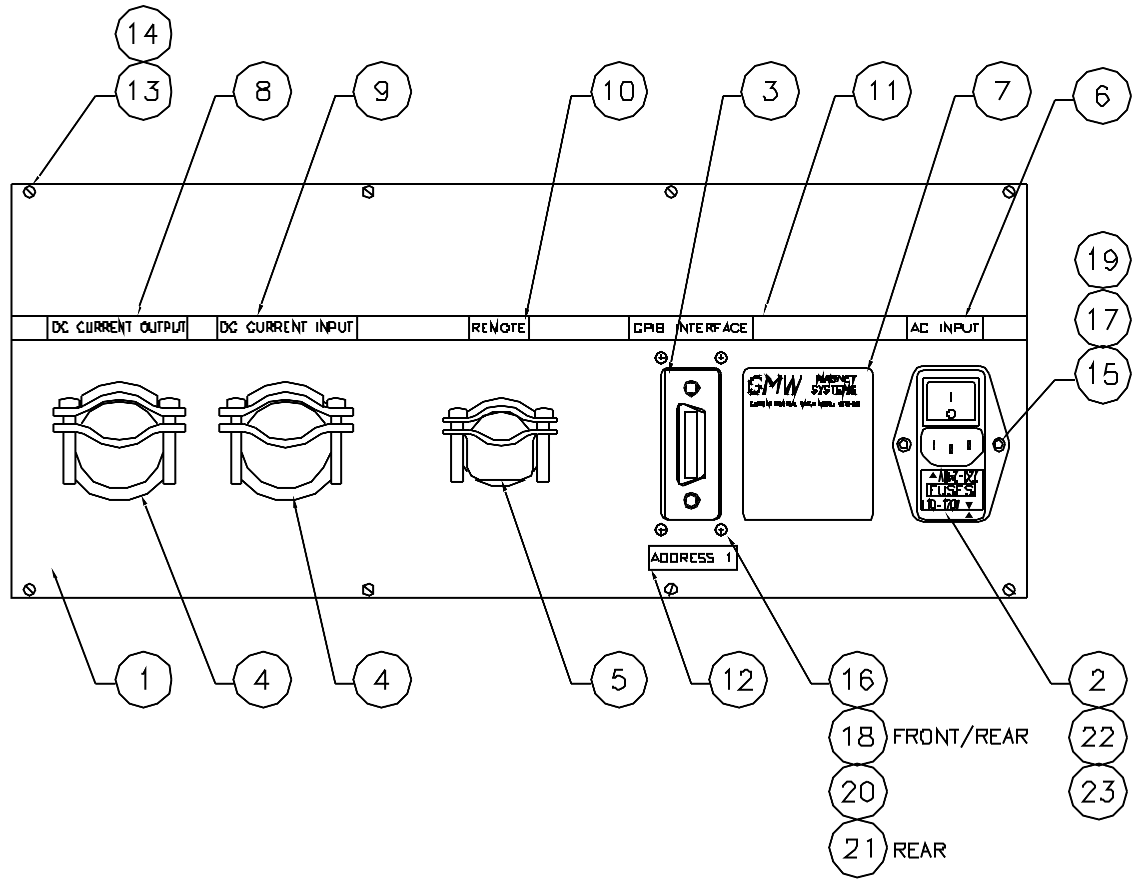
DO NOT SCALE FROM DRAWING

NEXT ASSY: 5970-80 SYSTEM
SOFTWARE: AUTOCAD 13
THIRD ANGLE PROJECTION

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TITLE: REVERSAL SWITCH FRONT PANEL ASSY

SIZE A1 DRAWING NO. 11900590 REV A
SCALE 1:1 WT kg SHEET 1 OF 1



WHEN INTERNAL ADI IS FITTED TO REVERSAL SWITCH USE DWG NO 11900601
WHEN INTERNAL ADI IS OMITTED ON REVERSAL SWITCH USE DWG NO 11900602

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		11/16/98	G.DOUGLAS

PARTS LIST

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
23	1	239001	FUSE LINK 1.0 A SLO BLO LITTLEFUSE	
22	1	239002	FUSE LINK 2.0 A SLO BLO LITTLEFUSE	
21	4	DIN 934	NUT, HEX M4 S/S	
20	4	DIN 6797	WASHER, M4 INTERNAL LOCK S/S	
19	2	DIN 6797	WASHER, M3 INTERNAL LOCK S/S	
18	8	DIN 433	WASHER, M4 S/S	
17	2	DIN 433	WASHER, FLAT M3 S/S	
16	4	DIN 7985A	SCREW, M4 X 12 PAN HD PHILLIPS S/S	
15	2	DIN 965A	SCREW, M3 X 10 FLAT HD PHILLIPS S/S	
14	8	63-119	SCREW, RETAINING ELMA	
13	8	63-301	BUSHINGS, ELMA	
12	1		LABEL, ADDRESS 1	
11	1		LABEL, GPIB INTERFACE	
10	1		LABEL, REMOTE	
9	1		LABEL, DC CURRENT INPUT	
8	1		LABEL, DC CURRENT OUTPUT	
7	1		LABEL, SPECIFICATION	
6	1		LABEL, AC INPUT	
5	1	3304	CABLE CLAMP, THOMAS & BETTS	
4	1	3305	CABLE CLAMP, THOMAS & BETTS	
3	1	CIB24BA	CONNECTOR, GPIB BULKHEAD MTG	
2	1	83511420	PLUG/SWITCH/FILTER	
1		17900960	BACK PANEL	

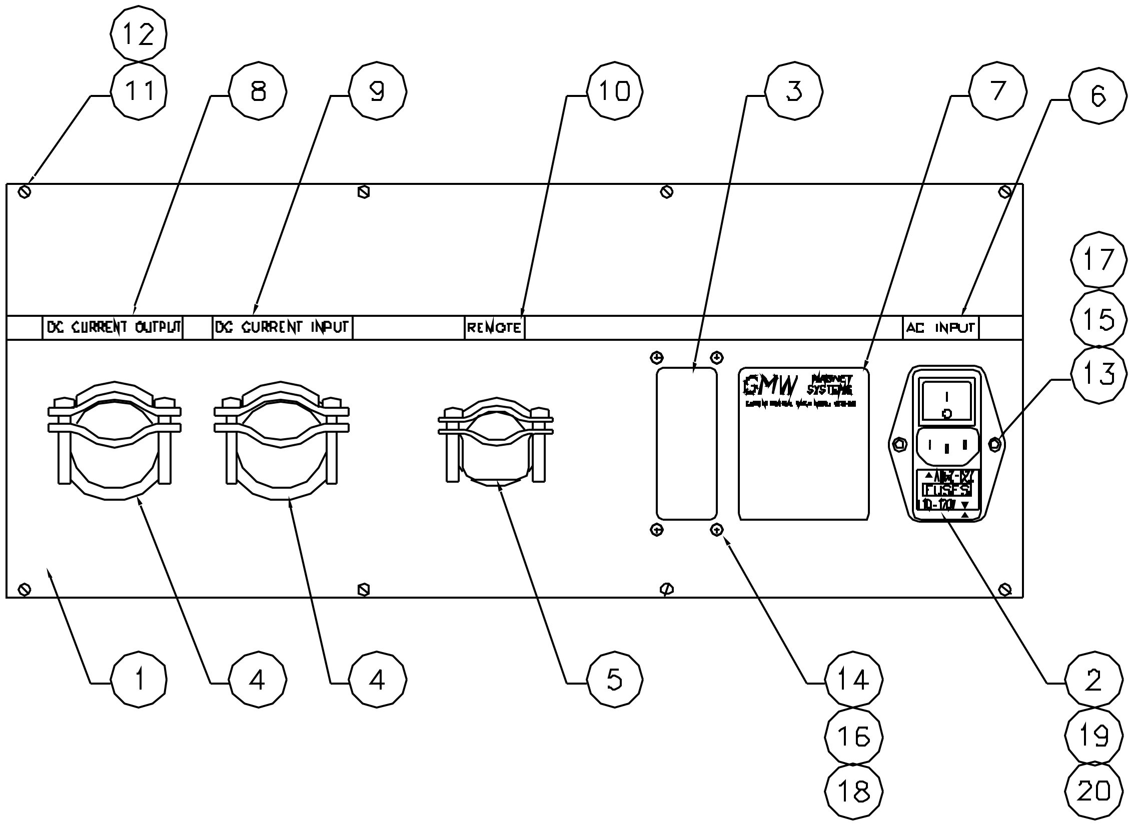
DRAWN G.DOUGLAS DATE 11/18/98
CHECK DATE
ENGINEERING DATE
DO NOT SCALE FROM DRAWING
NEXT ASSY 3870-80 SYSTEM
THIRD ANGLE PROJECTION
SOFTWARE: AUTOCAD 13

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Tel: (650)802-8292, Fax: (650)802-8298

TITLE REVERSAL SWITCH BACK PANEL ASSY

SIZE A1 DRAWING NO. 11900601 REV A
SCALE 1:1 SHEET 1 OF 1

PROPRIETARY



WHEN INTERNAL ADI IS FITTED TO REVERSAL SWITCH USE DWG NO 11900601
WHEN INTERNAL ADI IS OMITTED ON REVERSAL SWITCH USE DWG NO 11900602

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		11/26/98	G.DOUGLAS

PARTS LIST

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
20	1	239001	FUSE LINK 1.0 A SLO BLO LITTLEFUSE	
19	1	239002	FUSE LINK 2.0 A SLO BLO LITTLEFUSE	
18	4	DIN 6797	WASHER, M4 INTERNAL LOCK S/S	
17	2	DIN 6797	WASHER, M3 INTERNAL LOCK S/S	
16	8	DIN 433	WASHER, M4 S/S	
15	2	DIN 433	WASHER, FLAT M3 S/S	
14	4	DIN 7985A	SCREW, M4 X 12 PAN HD PHILLIPS S/S	
13	2	DIN 965A	SCREW, M3 X 10 FLAT HD PHILLIPS S/S	
12	8	63-119	SCREW, RETAINING ELMA	
11	8	63-301	BUSHINGS, ELMA	
10	1		LABEL, REMOTE	
9	1		LABEL, DC CURRENT INPUT	
8	1		LABEL, DC CURRENT OUTPUT	
7	1		LABEL, SPECIFICATION	
6	1		LABEL, AC INPUT	
5	1	3304	CABLE CLAMP, THOMAS & BETTS	
4	1	3305	CABLE CLAMP, THOMAS & BETTS	
3	1	17900060	COVER PLATE	
2	1	83511420	PLUG/SWITCH/FILTER	
1		17900960	BACK PANEL	

DRAWN G.DOUGLAS DATE 11/20/98
CHECK
ENGINEERING

DO NOT SCALE FROM DRAWING

NEXT ASSY 5870-80 SYSTEM

THIRD ANGLE PROJECTION

SOFTWARE: AUTOCAD 13

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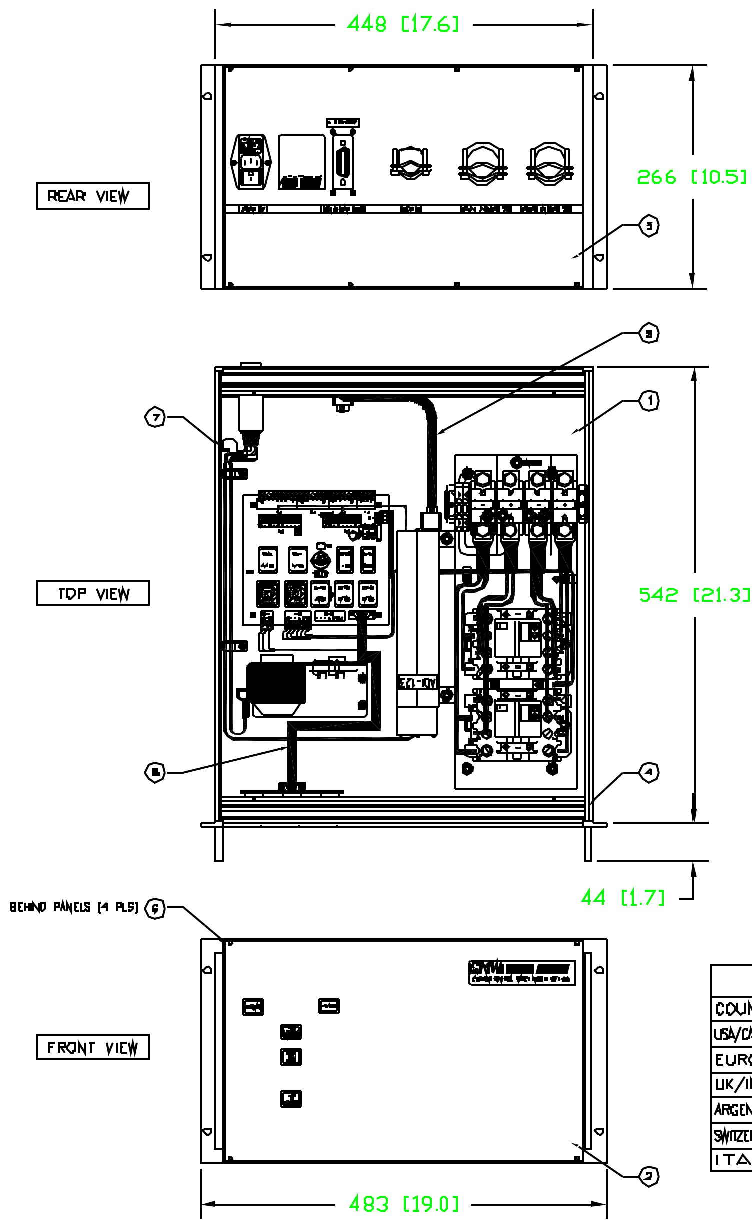
TITLE: REVERSAL SWITCH BACK PANEL ASSY

SIZE A1 DRAWING NO. 11900602 REV A

SCALE 1:1 SHEET 1 OF 1

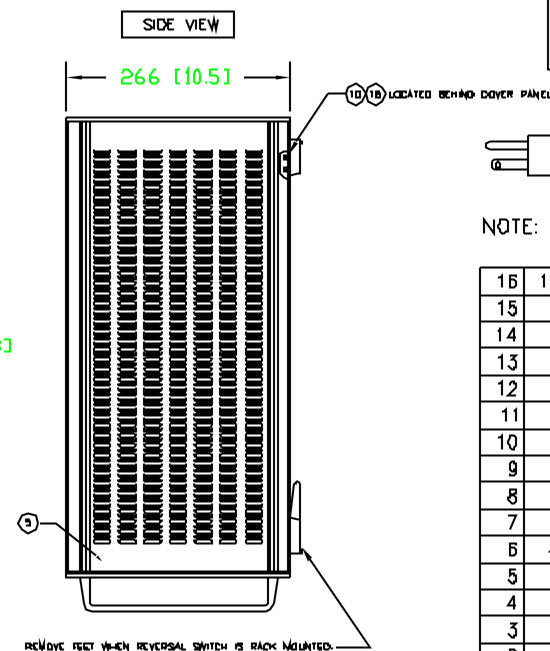
REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		12/04/98	G.DOUGLAS
B	ADD ITEM 16		03/22/00	G.DOUGLAS

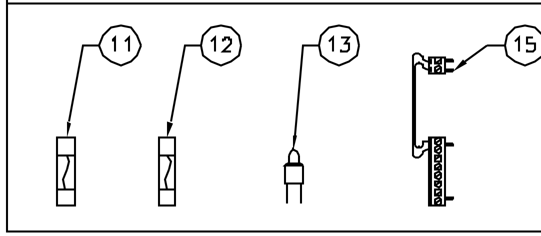


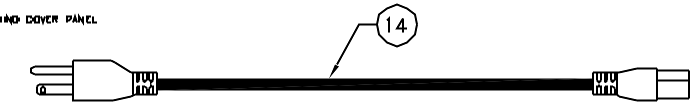
WHEN INTERNAL ADI IS FITTED TO REVERSAL SWITCH USE DWG NO 11900611

WHEN INTERNAL ADI IS OMITTED ON REVERSAL SWITCH USE DWG NO 11900612



SPARE PARTS KIT





NOTE: POWER CORDSET SHOWN FOR US/CANADA. SEE TABLE FOR POWER CORDSET SUITABLE FOR OTHER COUNTRIES

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
16	12	1904-12	SCREW, M4 x 10 LOW PROFILE HD, ELMA	
15	1	16900340	PCB 24 V POWER LINK	
14	1	70403020305	POWER CORDSET, PANEL COMPONENTS	
13	2	AT607-12V	LAMP 12 V, NKK	
12	5	239001	FUSE LINK 1.0 A SLO BLO LITTLEFUSE	
11	5	129002	FUSE LINK 2.0A SLO BLO LITTLEFUSE	
10	6	63-027	BASE PLATE KIT, ELMA	
9	1	CIF24-05M	CABLE, GPIB 0.5M LONG L-COM	
8	1	FRC10-0.5M	CABLE, RIBBON 10 WAY 0.5M LONG	
7	1	63-172	EARTHING KIT, ELMA	
6	4	63-068	TAPPED STRIP 2 X 6, M3 HOLES ELMA	
5	1	14Y167-10	COVER PLATE KIT GREY, ELMA	
4	1	14B067	CASE, RACK MTG 6U [with handles] ELMA	
3	1	11900651	BACK PANEL ASSEMBLY	
2	1	11900590	FRONT PANEL ASSEMBLY	
1	1	11900621	BASE PLATE ASSEMBLY	

PARTS LIST

REVERSAL SWITCH POWER CORDSETS

COUNTRY	RATING	MANUFACTURER AND PART NUMBER
USA/CANADA	115V/13A	PANEL COMPONENTS PART NO 70403020305
EUROPE	250/16A	PANEL COMPONENTS PART NO 86235000
UK/INDIA	230V/13A	PANEL COMPONENTS PART NO 86395090
ARGENTINA	220V/10A	PANEL COMPONENTS PART NO 86390010
SWITZERLAND	230V/10A	PANEL COMPONENTS PART NO 86396000
ITALY	230V/10A	PANEL COMPONENTS PART NO 86394000

DRAWN G.DOUGLAS — DATE 12/04/98
CHECK — DATE
ENGINEERING — DATE
NEXT ASSY — SYSTEM 5970-160
SOFTWARE AUTOCAD 13

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)

LINEAR	INCHES	mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	64✓	1.6✓

THIRD ANGLE PROJECTION

GMW
P.O Box 2578, Redwood City, CA 94064
Tel: (650)802-8292. Fax: (650)802-8298.

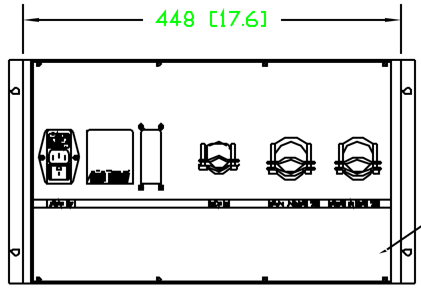
TITLE
REVERSAL SWITCH GENERAL ASSEMBLY

SIZE A2 — DRAWING NO. 11900611 — REV B
SCALE 1:4 — WT kg — SHEET 1 OF 1

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		12/04/98	G.DOUGLAS
B	ADD ITEM 15		03/22/00	G.DOUGLAS

REAR VIEW

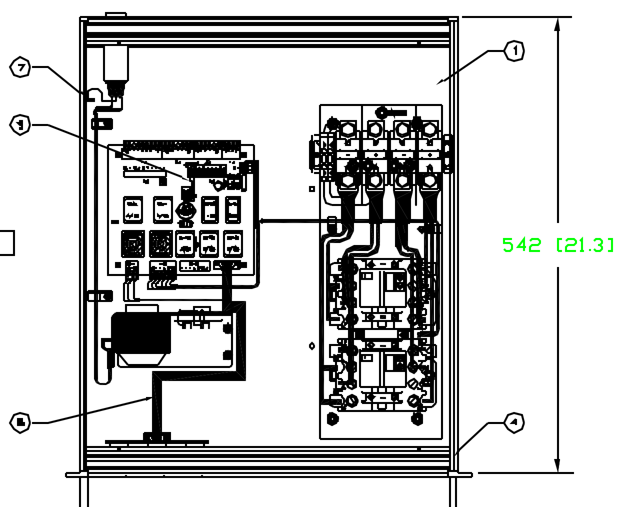


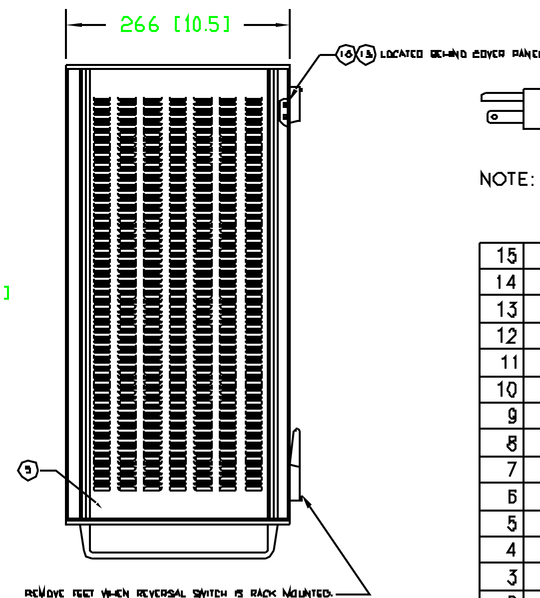
WHEN INTERNAL ADI IS FITTED TO REVERSAL SWITCH USE DWG NO 11900611

WHEN INTERNAL ADI IS OMITTED ON REVERSAL SWITCH USE DWG NO 11900612

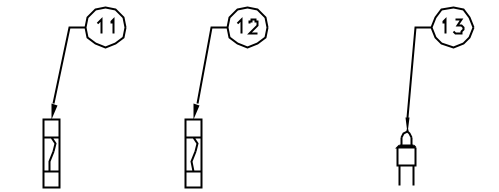
SIDE VIEW

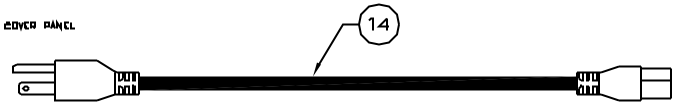
TOP VIEW





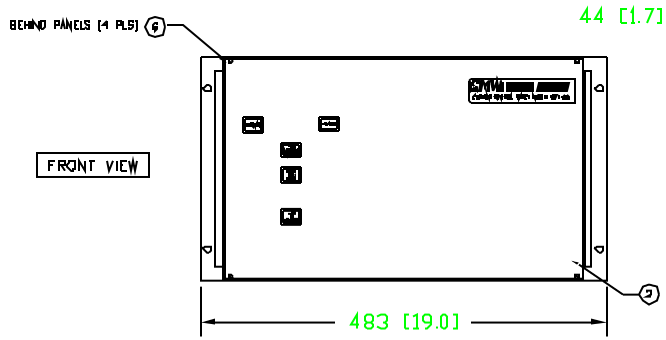
SPARE PARTS KIT





NOTE: POWER CORDSET SHOWN FOR US/CANADA. SEE TABLE FOR POWER CORDSET SUITABLE FOR OTHER COUNTRIES

FRONT VIEW



COUNTRY	RATING	MANUFACTURER AND PART NUMBER
USA/CANADA	115V/13A	PANEL COMPONENTS PART NO 70403020305
EUROPE	250/16A	PANEL COMPONENTS PART NO 86235000
UK/INDIA	230V/13A	PANEL COMPONENTS PART NO 86395090
ARGENTINA	220V/10A	PANEL COMPONENTS PART NO 86390010
SWITZERLAND	230V/10A	PANEL COMPONENTS PART NO 86396000
ITALY	230V/10A	PANEL COMPONENTS PART NO 86394000

REVERSAL SWITCH POWER CORDSETS

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
15	12	1904-12	SCREW, M4 x 10 LOW PROFILE HD, ELMA	
14	1	70401020244	POWER CORDSET, PANEL COMPONENTS	
13	2	AT607-12V	LAMP 12 V, NKK	
12	5	239001	FUSE LINK 1.0 A SLO BLO LITTLEFUSE	
11	5	129002	FUSE LINK 2.0 A SLO BLO LITTLEFUSE	
10	6	63-027	BASE PLATE KIT, ELMA	
9	1	16900340	PCB 24 V POWER LINK	
8	1	FRC10-0.5M	CABLE. RIBBON 10 WAY 0.5M LONG	
7	1	63-172	EARTHING KIT, ELMA	
6	4	63-068	TAPPED STRIP 2 X 6, M3 HOLES ELMA	
5	1	14Y167-10	COVER PLATE KIT GREY, ELMA	
4	1	148067	CASE, RACK MTG 6U [with handles] ELMA	
3	1	11900652	BACK PANEL ASSEMBLY	
2	1	11900590	FRONT PANEL ASSEMBLY	
1	1	11900622	BASE PLATE ASSEMBLY	

PARTS LIST

DRAWN G.DOUGLAS	DATE 12/04/98	DO NOT SCALE FROM DRAWING	
CHECK	DATE	DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)	
ENGINEERING	DATE		
	5970-160		
NEXT ASSY	SYSTEM	THIRD ANGLE PROJECTION	
SOFTWARE AUTOCAD 13			

LINEAR	INCHES	mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	64	1.6

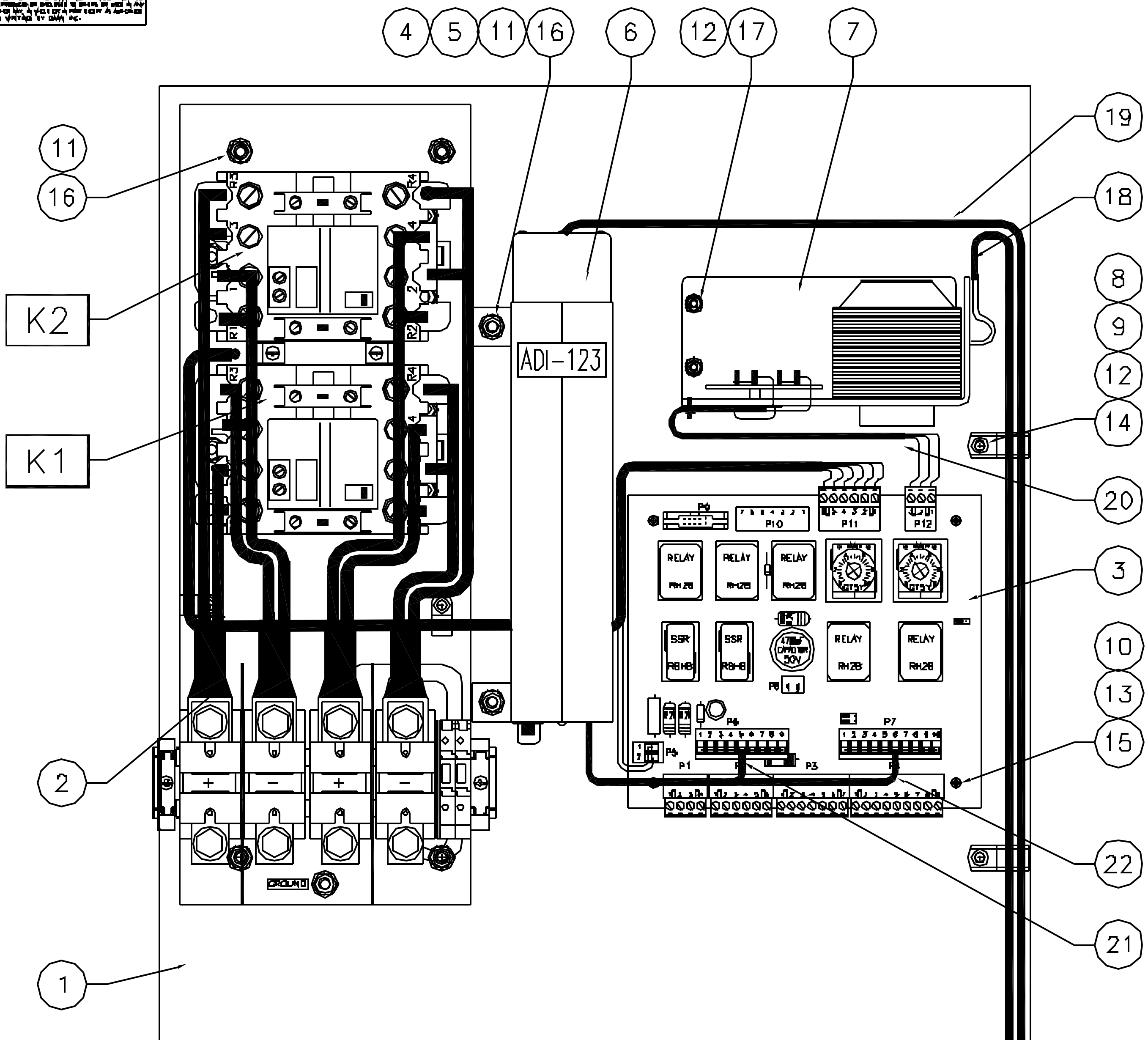
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TITLE
REVERSAL SWITCH GENERAL ASSEMBLY

SIZE A2 | DRAWING NO. 11900612 | REV B

SCALE 1:4 | WT kg | SHEET 1 OF 1

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		12/01/98	G.DOUGLAS



WHEN INTERNAL ADI IS FITTED TO REVERSAL SWITCH USE DWG NO 11900621

WHEN INTERNAL ADI IS OMITTED ON REVERSAL SWITCH USE DWG NO 11900622

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
22	1	5008C	CABLE, 8 CORE 22 AWG, ALPHA	
21	1	5008C	CABLE, 8 CORE 22 AWG ALPHA	
20	1	5053C	CABLE, 3 CORE 20 AWG ALPHA	
19	1	5056C	CABLE, 6 CORE 20 AWG ALPHA	
18	1	5056C	CABLE, 6 CORE 20 AWG ALPHA	
17	4		KEPNUT, M4 S/S	
16	8		KEPNUT, M6 S/S	
15	4	DIN 6797	WASHER, M3 INT LOCK S/S	
14	2	DIN 6797	WASHER, M4 INT LOCK S/S	
13	4	DIN 125 A	WASHER, M3 FLAT S/S	
12	2	DIN 125 A	WASHER, M4 FLAT S/S	
11	8	DIN 125 A	WASHER, M6 FLAT S/S	
10	4	DIN 7985A	SCREW, M3 X 16 PAN HD S/S	
9	2	DIN 7985A	SCREW, M4 X 8 PAN HD S/S	
8	2	ECC8	CABLE CLAMP	
7	1	HC24-2.4A	POWER SUPPLY 24V CONDOR	
6	1	ADI-123	ANALOG DEVICE INTERFACE, GROUP3	
5	1	17900680	ADI MOUNTING STUDS	
4	2	17900670	ADI MOUNTING BRACKETS	
3	1	15900000	MAIN CONTROL BOARD	
2	1	11900630	CONTACTOR ASSEMBLY 160 AMP	
1	1	17900930	BASE PLATE	

PARTS LIST

DRAWN G.DOUGLAS DATE 12/01/98
CHECK DATE
ENGINEERING DATE

DO NOT SCALE FROM DRAWING

NEXT ASSY 11900611 · SYSTEM 5970-160

SOFTWARE AUTOCAD 13

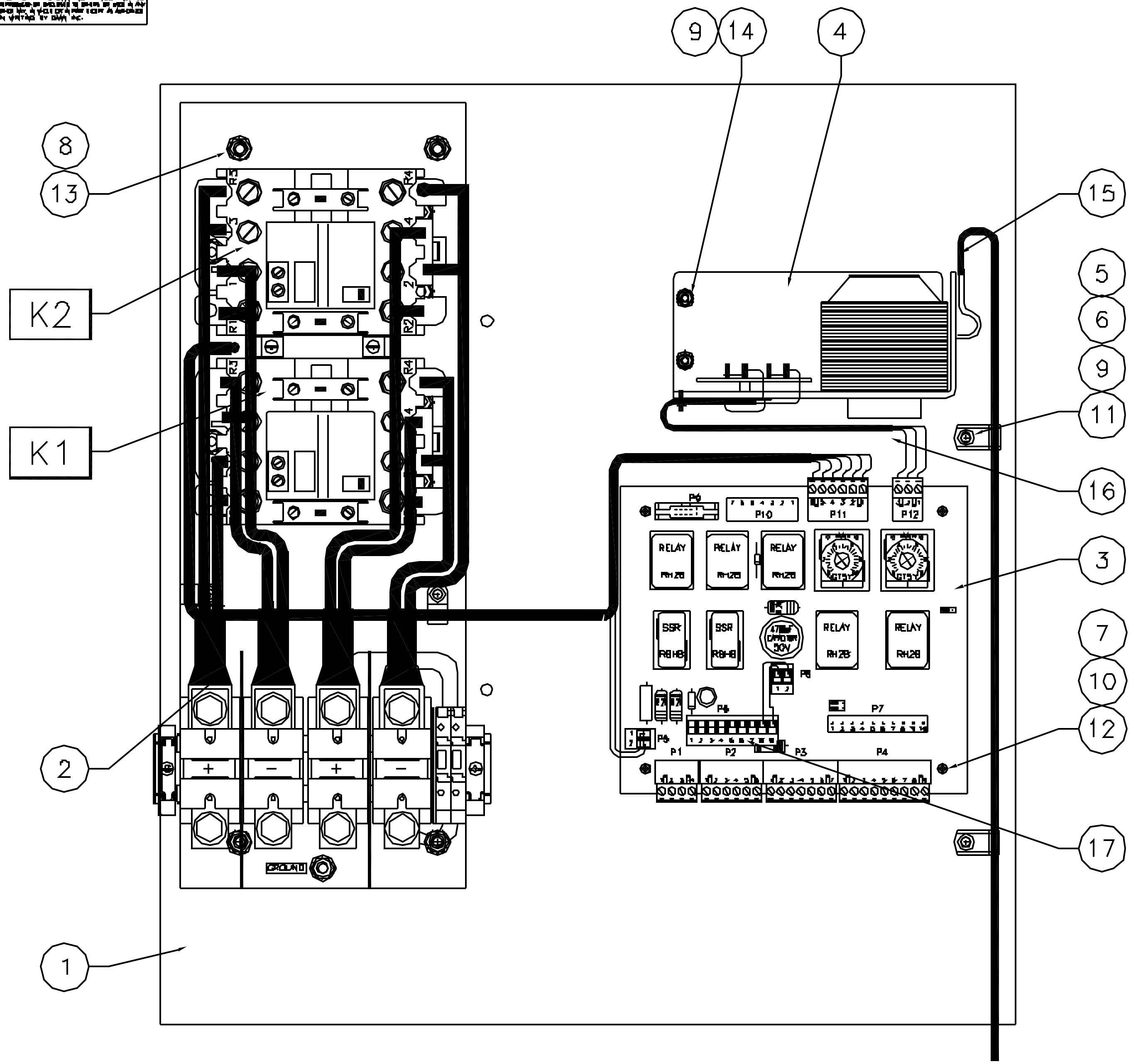
THIRD ANGLE PROJECTION

GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (650)802-8292. Fax: (650)802-8298.

TITLE: REVERSAL SWITCH BASE PLATE ASSY

SIZE A1 · DRAWING NO. 11900621 · REV A

SCALE 1:1 · SHEET 1 OF 1



REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		12/01/98	G.DOUGLAS

WHEN INTERNAL ADI IS FITTED TO REVERSAL SWITCH USE DWG NO 11900621

WHEN INTERNAL ADI IS OMITTED ON REVERSAL SWITCH USE DWG NO 11900622

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
17	1	1690034	PCB 24 V POWER LINK	
16	1	5053C	CABLE, 3 CORE 20 AWG ALPHA	
15	1	5056C	CABLE, 6 CORE 20 AWG ALPHA	
14	4		KEPNUT, M4 S/S	
13	6		KEPNUT, M6 S/S	
12	4	DIN 6797	WASHER, M3 INT LOCK S/S	
11	2	DIN 6797	WASHER, M4 INT LOCK S/S	
10	4	DIN 125 A	WASHER, M3 FLAT S/S	
9	6	DIN 125 A	WASHER, M4 FLAT S/S	
8	4	DIN 125 A	WASHER, M6 FLAT S/S	
7	4	DIN 7985A	SCREW, M3 X 12 PAN HD S/S	
6	2	DIN 7985A	SCREW, M4 X 8 PAN HD S/S	
5	2	ECC4	CABLE CLAMP	
4	1	HC24-2.4A	POWER SUPPLY 24V CONDOR	
3	1	15900000	MAIN CONTROL BOARD	
2	1	11900830	CONTACTOR ASSEMBLY 160 AMP	
1	1	17900930	BASE PLATE	

PARTS LIST

DRAWN G.DOUGLAS DATE 12/01/98

DO NOT SCALE FROM DRAWING

GMW
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Tel: (650)802-8292. Fax: (650)802-8298.

TITLE: REVERSAL SWITCH BASE PLATE ASSY

NEXT ASSY: 11900611 SYSTEM: 5970-160

THIRD ANGLE PROJECTION

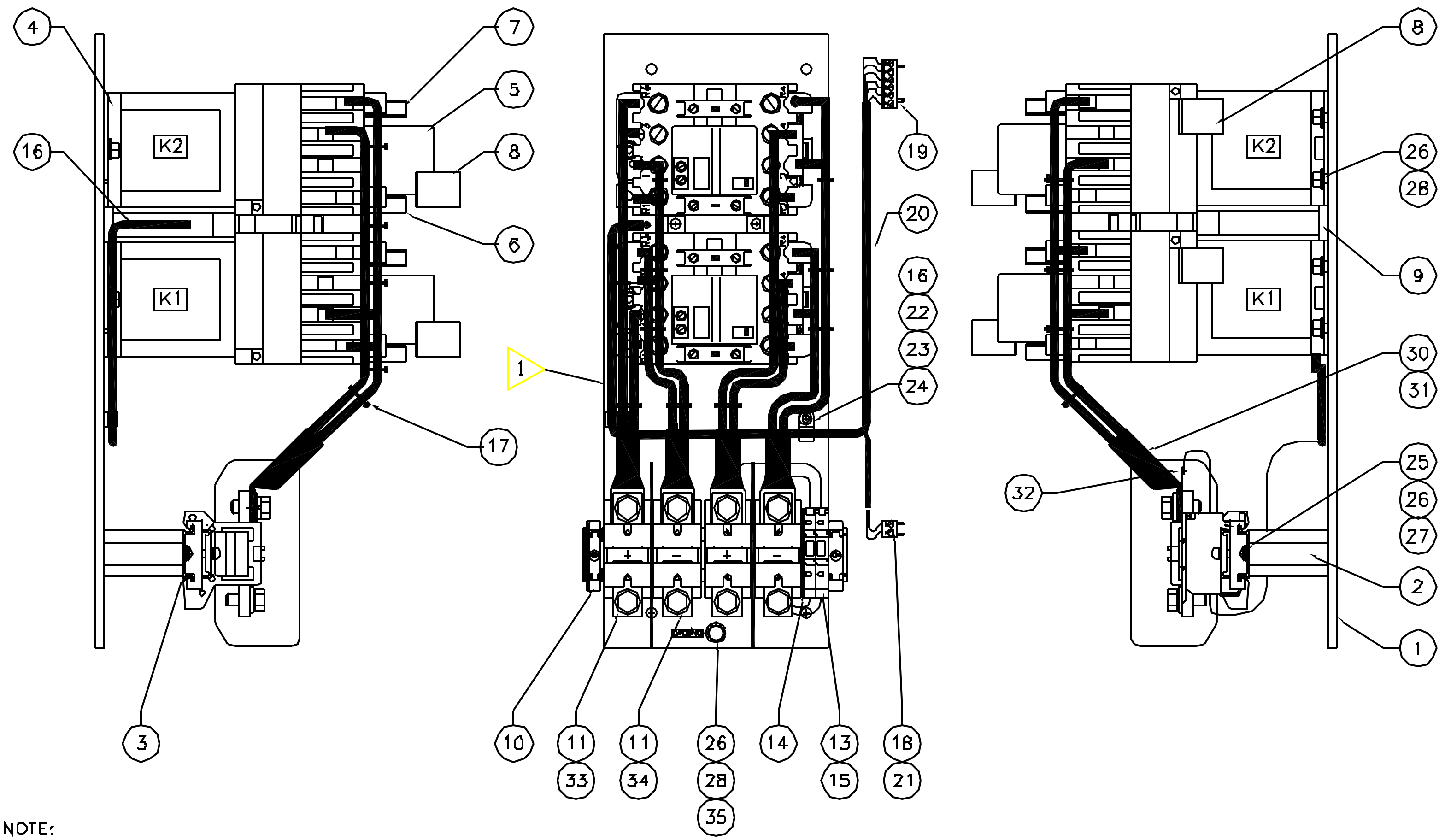
SOFTWARE: AUTOCAD 13

SIZE: A1 DRAWING NO. 11900622 REV: A

SCALE 1:1 SHEET 1 OF 1

REVERSAL SWITCH
80 AMP CONTACTOR ASSY
USE DWG NO 11900580

REVERSAL SWITCH
160 AMP CONTACTOR ASSY
USE DWG NO 11900630



NOTE:

1. POSITIVE AND NEGATIVE WIRING SHOWN SEPARATED FOR CLARITY.
POSITIVE AND NEGATIVE WIRES TIED TOGETHER ON EACH SIDE OF CONTACTOR WITH ITEM 17 ON FINAL ASSEMBLY.

ITEM	QTY	PART NUMBER	DESCRIPTION
35	2		LABEL, GROUND
34	2		LABEL, NEGATIVE
33	2		LABEL, POSITIVE
32	2	108001	SOLDER LUG, M8 HOLE HOB
31	A/R		SLEEVING, HEATSHRINK 19mm 3/4" BLACK
30	4	LCB2/0-38	LUG, 2/0 AWG M8 HOLE PANDUIT
29	A/R	5J-0601	CABLE, 6 AWG WELDING BLACK ANIXTER
28	4		KEPNUT, M8
27	6	DIN 6797	WASHER, M6 INT LOCK S/S
26	3	DIN 125 A	WASHER, M6 FLAT S/S
25	3	DIN 7985A	SCREW, M6 x 10 PAN HD S/S
24	3	DIN 6797	WASHER, M4 INT LOCK S/S
23	3	DIN 125 A	WASHER, M4 FLAT S/S
22	3	DIN 7985A	SCREW, M4 x 10 PAN HD S/S
21	1		CABLE, 2 CORE
20	1		CABLE, 6 CORE
19	1	1757051	PLUG, 6 WAY PHOENIX
18	1	1757019	PLUG 2 WAY, PHOENIX
17	6	PLT2M-C	CABLE TIE, MINIATURE PANDUIT
16	3		CABLE CLAMP
15	2	239002	FUSE LINK, 2 AMP 20x5mm LITTELFUSE
14	1	380266	PARTITION, ASK1 WEIDMULLER
13	2	47456	FUSE TERMINAL, ASK1 WEIDMULLER
12	2	1514.0	PARTITION, WEIDMULLER
11	4	6374.2	STUD TERMINAL, M8 WEIDMULLER
10	2	BNL-5	CLAMPS, DIN RAIL IDEC
9	1	LA9D4002	MECHANICAL INTERLOCK TELEMECANIQUE
8	4	LA4-DC3U	COIL SUPRESSOR, TELEMECANIQUE
7	2	LA1-DN01	AUX CONTACT NC, TELEMECANIQUE
6	2	LA1-DN10	AUX CONTACT NO, TELEMECANIQUE
5	2	LA6-DK10B	CONTACTOR, LATCH TELEMECANIQUE
4	2	LP1-D65008-BD	CONTACTOR, 2NC/2NO TELEMECANIQUE
3	1	17900670	DIN RAIL, ALUMINUM IDEC
2	3	17900660	STANDOFF
1	1	17900640	CONTACTOR MOUNTING BRACKET

PARTS LIST

DO NOT SCALE FROM DRAWING

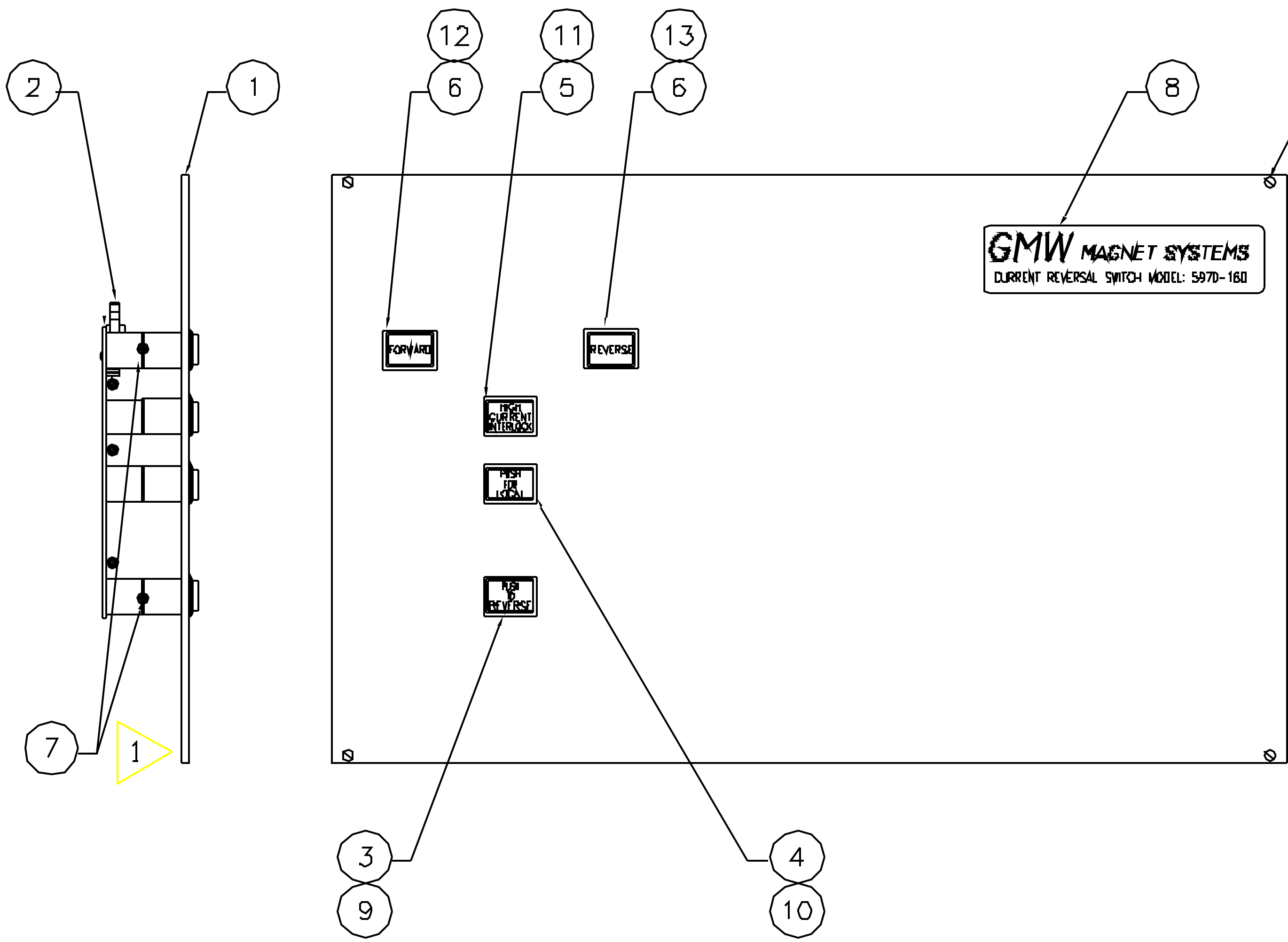
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Tel: (650)802-8292, Fax: (650)802-8298.

REVERSAL SWITCH
CONTACTOR ASSY

A0 11900630 A

SCALE 1:1

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		11/26/08	G.DOUGLAS



NOTE:

1. APPLY RTV TO FOLLOWING PLACES
BOTH SIDES OF ITEM 3
OUTSIDE SURFACE OF FORWARD INDICATOR
OUTSIDE SURFACE OF REVERSE INDICATOR

PARTS LIST

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
15	4	63-119	SCREWS, RETAINING ELMA	
14	4	63-301	BUSHINGS, ELMA	
13	1		LABEL, REVERSE	
12	1		LABEL, FORWARD	
11	1		LABEL, HIGH CURRENT INTERLOCK	
10	1		LABEL, PUSH for LOCAL	
9	1		LABEL, PUSH to REVERSE	
8	1		LABEL, MODEL NUMBER	
7	A/R	DOW.CORN 3145	RTV ADHESIVE, NON CORROSIVE	
6	2	LB03KW01128J	INDICATOR, YELLOW LENS NKK	
5	1	LB03KW01128J	INDICATOR, WHITE LENS NKK	
4	1	LB26RKWD1128J	PUSHBUTTON, LATCH WHITE LENS NKK	
3	1	LB25RKWD112FJ	PUSHBUTTON, MOMENTARY GREEN LENS NKK	
2	1	15900010	FRONT PANEL PCB ASSEMBLY	
1		17900840	FRONT PANEL	

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DRAWN G.DOUGLAS DATE 11/21/08
CHECK DATE
ENGINEERING DATE

DO NOT SCALE FROM DRAWING

NEXT ASSY 5970-160 SYSTEM

SOFTWARE: AUTOCAD 13

THIRD ANGLE PROJECTION

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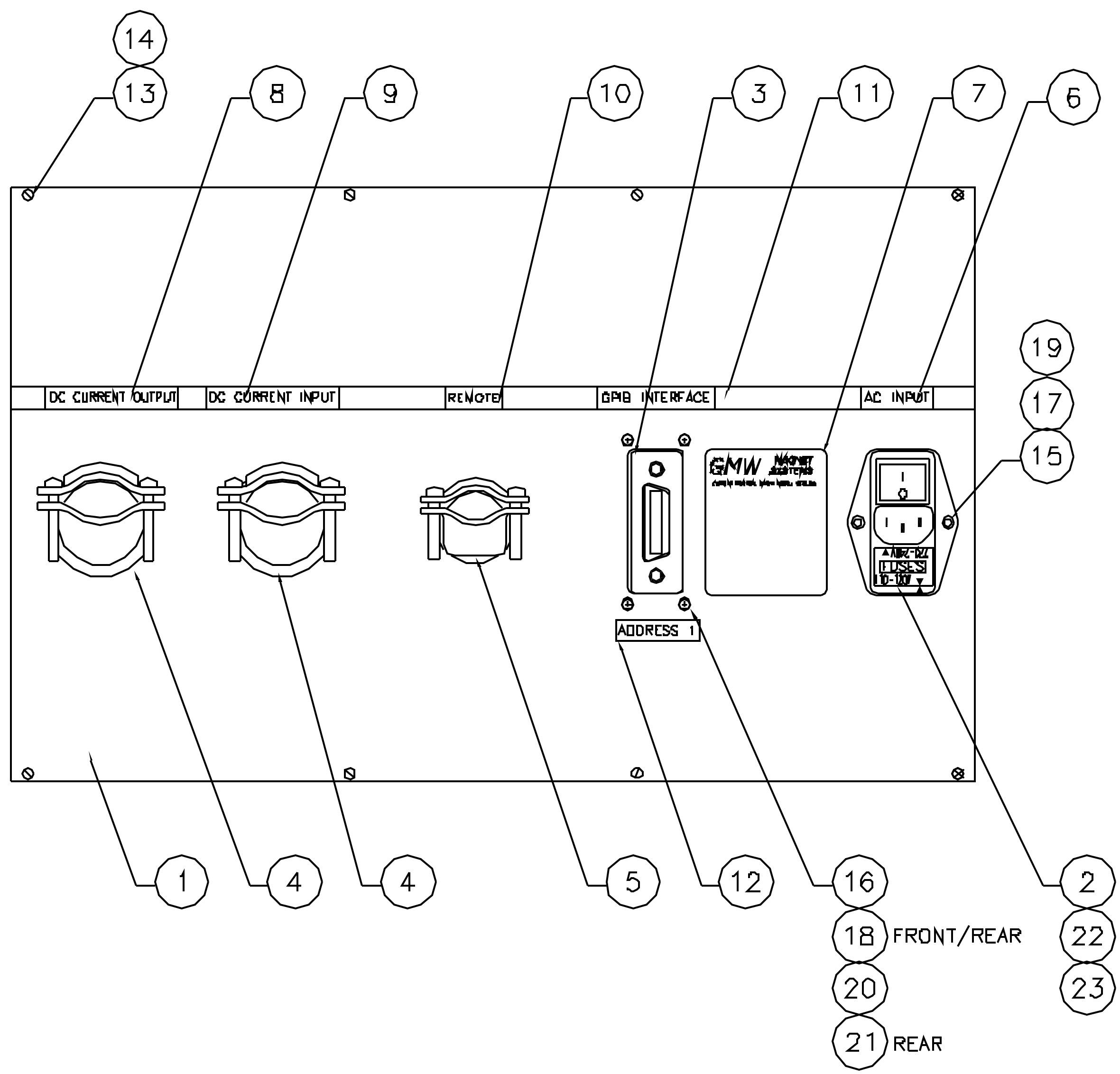
TITLE: REVERSAL SWITCH FRONT PANEL ASSY

SIZE A1 | DRAWING NO. 11900640 | REV A

SCALE 1:1 | SHEET 1 OF 1

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		11/26/98	G.DOUGLAS



WHEN INTERNAL ADI IS FITTED TO REVERSAL SWITCH USE DWG NO 11900651
WHEN INTERNAL ADI IS OMITTED ON REVERSAL SWITCH USE DWG NO 11900652

PARTS LIST

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
23	1	239001	FUSE LINK 1.0 A SLO BLO LITTLEFUSE	
22	1	239002	FUSE LINK 2.0 A SLO BLO LITTLEFUSE	
21	4	DIN 934	NUT, HEX M4 S/S	
20	4	DIN 6797	WASHER, M4 INTERNAL LOCK S/S	
19	2	DIN 6797	WASHER, M3 INTERNAL LOCK S/S	
18	8	DIN 433	WASHER, M4 S/S	
17	2	DIN 433	WASHER, FLAT M3 S/S	
16	4	DIN 7985A	SCREW, M4 X 12 PAN HD PHILLIPS S/S	
15	2	DIN 965A	SCREW, M3 X 10 FLAT HD PHILLIPS S/S	
14	8	63-119	SCREW, RETAINING ELMA	
13	8	63-301	BUSHINGS, ELMA	
12	1		LABEL, ADDRESS 1	
11	1		LABEL, GPIB INTERFACE	
10	1		LABEL, REMOTE	
9	1		LABEL, DC CURRENT INPUT	
8	1		LABEL, DC CURRENT OUTPUT	
7	1		LABEL, SPECIFICATION	
6	1		LABEL, AC INPUT	
5	1	3304	CABLE CLAMP, THOMAS & BETTS	
4	1	3305	CABLE CLAMP, THOMAS & BETTS	
3	1	CB248A	CONNECTOR, GPIB BULKHEAD MTG	
2	1	83511420	PLUG/SWITCH/FILTER	
1		17900850	BACK PANEL	

DRAWN G.DOUGLAS DATE 11/26/98
CHECK DATE
ENGINEERING DATE

DO NOT SCALE FROM DRAWING

NEXT ASSY 5870-160 SYSTEM
THIRD ANGLE PROJECTION
SOFTWARE: AUTOCAD 13

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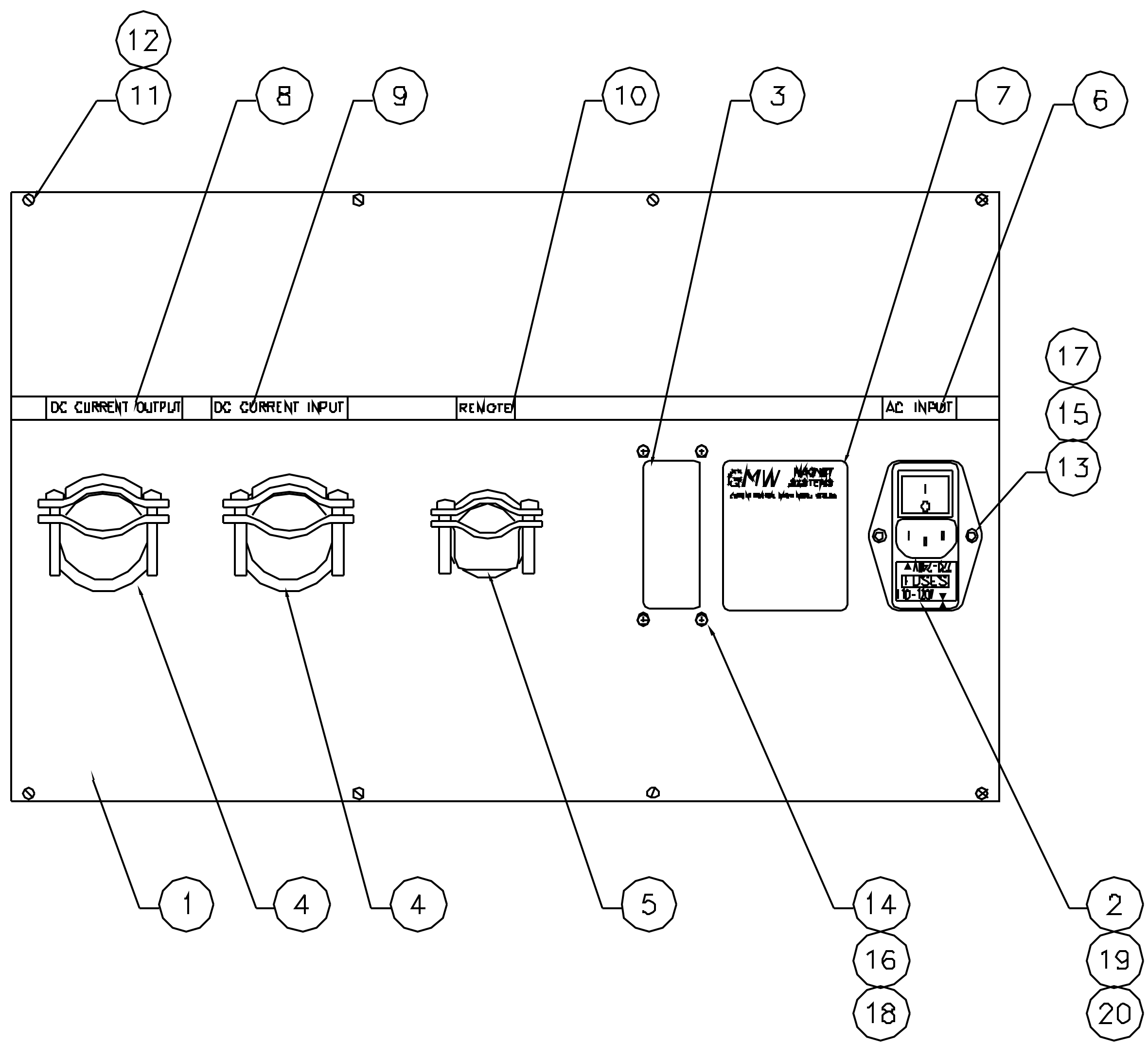
TITLE
REVERSAL SWITCH BACK PANEL ASSY

SIZE A1 DRAWING NO. 11900651 REV A

SCALE 1:1 SHEET 1 OF 1

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		11/26/98	G.DOUGLAS



ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
20	1	239001	FUSE LINK 1.0 A SLO BLO LITTLEFUSE	
19	1	239002	FUSE LINK 2.0 A SLO BLO LITTLEFUSE	
18	4	DIN 6797	WASHER, M4 INTERNAL LOCK S/S	
17	2	DIN 6797	WASHER, M3 INTERNAL LOCK S/S	
16	8	DIN 433	WASHER, M4 S/S	
15	2	DIN 433	WASHER, FLAT M3 S/S	
14	4	DIN 7985A	SCREW, M4 X 12 PAN HD PHILLIPS S/S	
13	2	DIN 965A	SCREW, M3 X 10 FLAT HD PHILLIPS S/S	
12	8	63-119	SCREW, RETAINING ELMA	
11	8	63-301	BUSHINGS, ELMA	
10	1		LABEL, REMOTE	
9	1		LABEL, DC CURRENT INPUT	
8	1		LABEL, DC CURRENT OUTPUT	
7	1		LABEL, SPECIFICATION	
6	1		LABEL, AC INPUT	
5	1	3304	CABLE CLAMP, THOMAS & BETTS	
4	1	3305	CABLE CLAMP, THOMAS & BETTS	
3	1	17900060	COVER PLATE	
2	1	83511420	PLUG/SWITCH/FILTER	
1		17900850	BACK PANEL	

PARTS LIST

DRAWN G.DOUGLAS DATE 11/26/98
CHECK DATE
ENGINEERING DATE

DO NOT SCALE FROM DRAWING

GMW
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Tel: (650)802-8292, Fax: (650)802-8298

TITLE
REVERSAL SWITCH
BACK PANEL ASSY

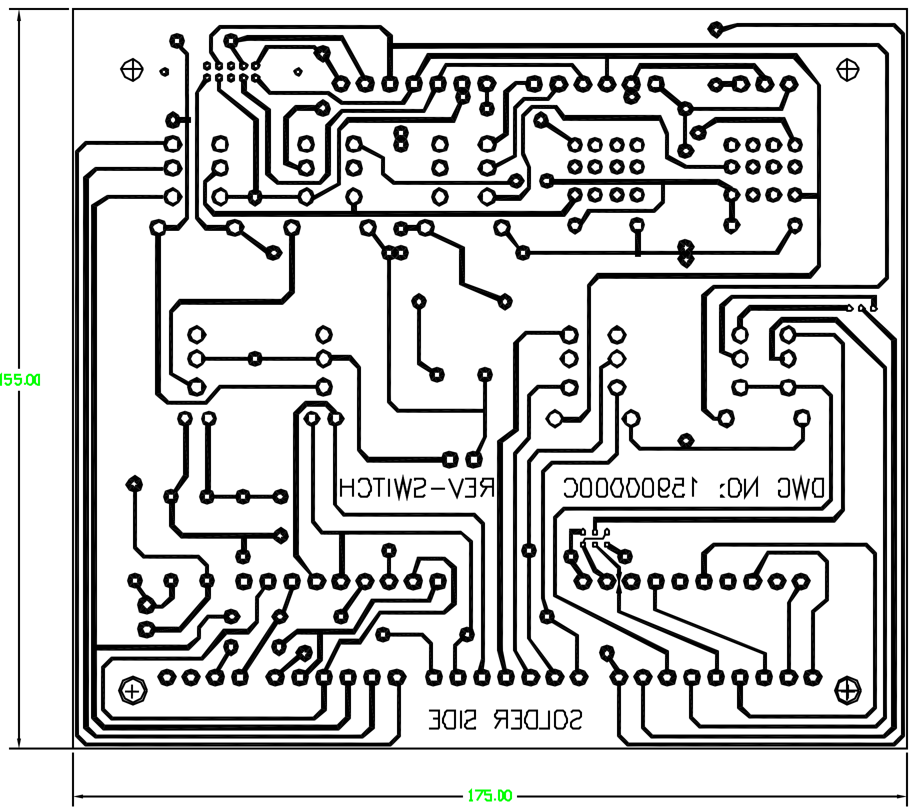
5870-160 NEXT ASSY SYSTEM
THIRD ANGLE PROJECTION
SIZE A1 DRAWING NO. 11900652 REV A
SOFTWARE: AUTOCAD 13
SCALE 1:1 SHEET 1 OF 1

WHEN INTERNAL ADI IS FITTED TO REVERSAL SWITCH USE DWG NO 11900651
WHEN INTERNAL ADI IS OMITTED ON REVERSAL SWITCH USE DWG NO 11900652

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		09/05/96	G.DOUGLAS
B	ADD CAPACITOR @ B7		09/01/98	G.DOUGLAS
C	INCREASE SPACE BETWEEN P1, P2, P3, P4		12/07/98	G.DOUGLAS

TIMER SETTINGS	
TM1	TM2
6.0 SECONDS	5.5 SECONDS

NOTE
MINIMUM TIME DIFFERENCE BETWEEN TIMERS TM1 AND TM2 IS 0.5 SECONDS



ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
32	1		CAPACITOR 0.33uF	
31	2		SCREW, M3 X 6 PAN HD S/S	
30	A/R		CABLE, WIRE WRAP	
29	3	68786-202	JUMPER/LINK, BERG	
28	1	69190-303	CONNECTOR, HEADER 3 WAY BERG	JP3
27	1	67997-303	CONNECTOR, HEADER 6 WAY BERG	JP1,2
26	1	CDN-IDH-10S-L	CONNECTOR, RIBBON VERT. PAN PACIFIC	P9
25	1	1755817	CONNECTOR, 10 WAY VERTICAL PHOENIX	P7
24	1	1755804	CONNECTOR, 9 WAY VERTICAL PHOENIX	P6
23	2	1755736	CONNECTOR, 2 WAY VERTICAL PHOENIX	P5
22	1	1757310	CONNECTOR, 9 WAY HORIZONAL PHOENIX	P4
21	1	1757297	CONNECTOR, 7 WAY HORIZONAL PHOENIX	P3
20	2	1757284	CONNECTOR, 6 WAY HORIZONAL PHOENIX	P2
19	1	1757268	CONNECTOR, 4 WAY HORIZONAL PHOENIX	P1
18	1	1757255	CONNECTOR, 3 WAY HORIZONAL PHOENIX	P12
17	1	SK24X	DIODE, ZENER 24V 1W, HARRIS	
16	1	1N4007	DIODE, 1A, MOTOROLA	
15	1		CAPACITOR, 4700uF/50V NTE	
14	1		CAPACITOR, 220uF/50V NTE	
13	2		RESISTOR, 2K OHM/2W NTE	
12	1		RESISTOR, 1.8K OHM/2W NTE	
11	1		RESISTOR, 200 OHM/2W NTE	
10	5	SY4S-51F1	SPRING, HOLD DOWN, IDEC	
9	5	SH2B-62	BASE, 8 BLADE, PCB MTG, IDEC	
8	5	RH2B-LC-DC24V	RELAY 2 NO/NC 8 BLADE BASE, IDEC	
7	2	SH1B-62	BASE 5 BLADE, PCB MTG, IDEC	
6	5	RB4B-0502	RELAY, DC , 5 BLADE BASE, IDEC	
5	8	SFA-302	SPRING, RELAY/TIMER HOLD DOWN, IDEC	
4	2	SY4S-61	BASE, TIMER BLADE TYPE, PCB MTG IDEC	
3	2	GT5Y-2SN1D24	TIMER, DELAY ON, DPDT, 24VDC IDEC	
2	4	KFSE-3.5-6	STANDOFFS, SELF CLINCHING, PEM	
1	1	14900000	PRINTED CIRCUIT BOARD	

PARTS LIST

JUMBER POSITIONS [DEFAULT]
JP2, JP1, JP3
FOR POWER TEN P63/P62 SERIES

JUMBER POSITIONS [OPTIONAL]
JP2, JP1, JP3
FOR POWER TEN 3300/4500/4600 SERIES

DRAWN G.DOUGLAS DATE 09/05/96
CHECK DATE
ENGINEERING DATE
5970
NEXT ASSY SYSTEM
SOFTWARE AUTOCAD 13

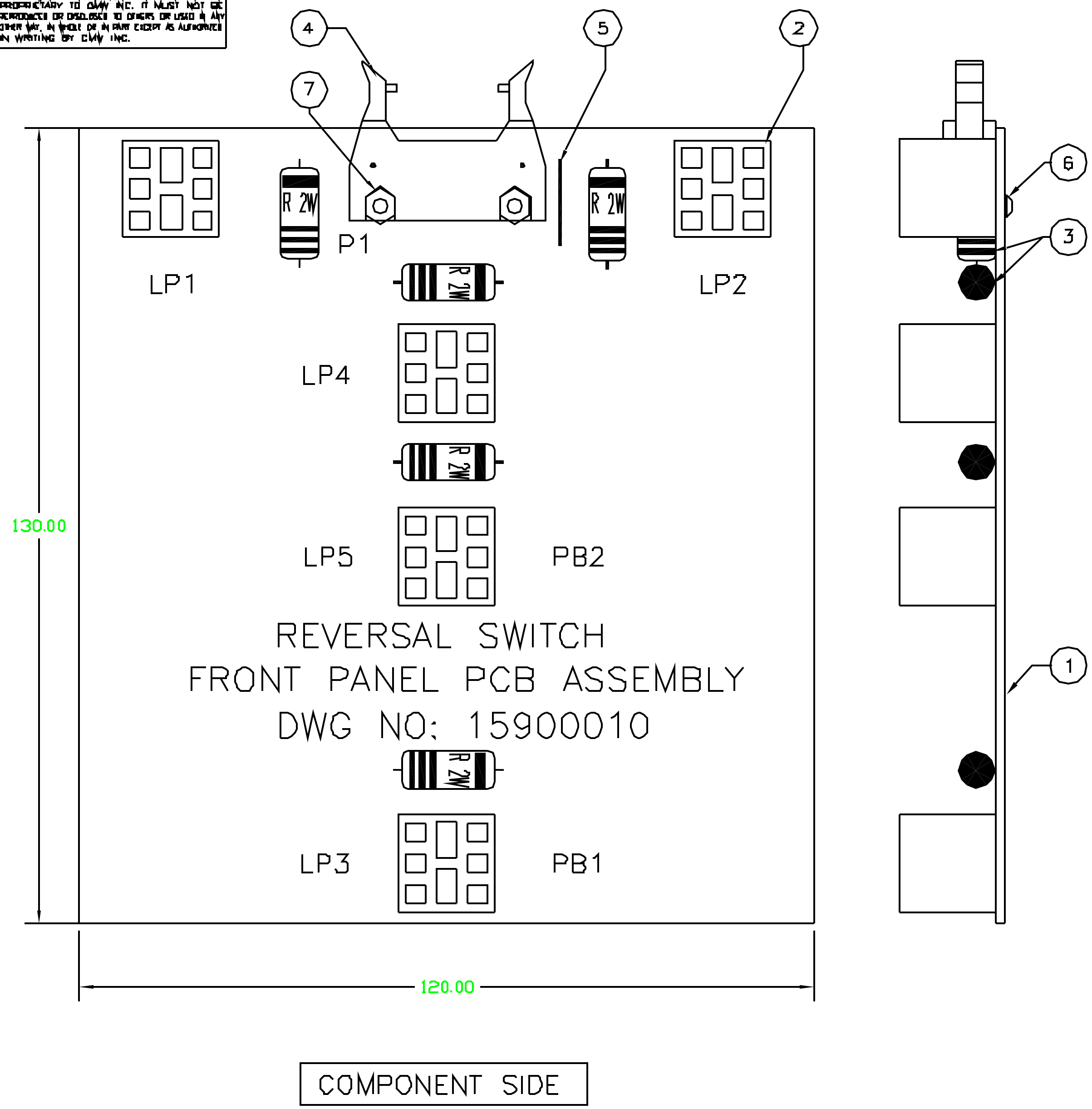
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THIRD ANGLE PROJECTION

GMW
P.O. Box 2578, Redwood City, CA 94064
Tel: (650)802-8292. Fax: (650)802-8298.

TITLE
REVERSAL SWITCH CONTROL PCB ASSY

SIZE A1 DRAWING NO. 15900000 REV C
SCALE 2:1 SHEET 1 OF 1

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REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		07/23/96	G.DOUGLAS

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
7	2	MHNN-2	NUT, HEX M2 NYLON	
6	2	MHN-25-10	SCREW M2.5 X 10, CHEESE HD NYLON	
5	1		WIRE LINK T.C.W	
4	1	CON-IDH-10S-L	CONNECTOR, HEADER HOZ MTG, P/P	
3	5		RESISTOR, 200 OHMS 2 WATTS, NTE	
2	5	AT712	SOCKET, PCB MTG, NKK	
1	1	1490X000	PRINTED CIRCUIT BOARD	

PARTS LIST

DRAWN G.DOUGLAS DATE 07/23/96
CHECK DATE
ENGINEERING DATE

DO NOT SCALE FROM DRAWING
DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)

LINEAR	INCHES	mm
X.XXX	±.005	±0.03
X.XX	±.01	±0.1
X.X	±.03	±0.3
X	±.06	±1
DEG.	±.5	±0.5
FINISH	64 ✓	1.6 ✓

THIRD ANGLE PROJECTION

NEXT ASSY: 5970 SYSTEM

SOFTWARE AUTOCAD 13

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TITLE
REVERSAL SWITCH FRONT PANEL PCB

SIZE A2 | DRAWING NO. 15900010 | REV A

SCALE 2:1 | WT kg | SHEET 1 OF 1